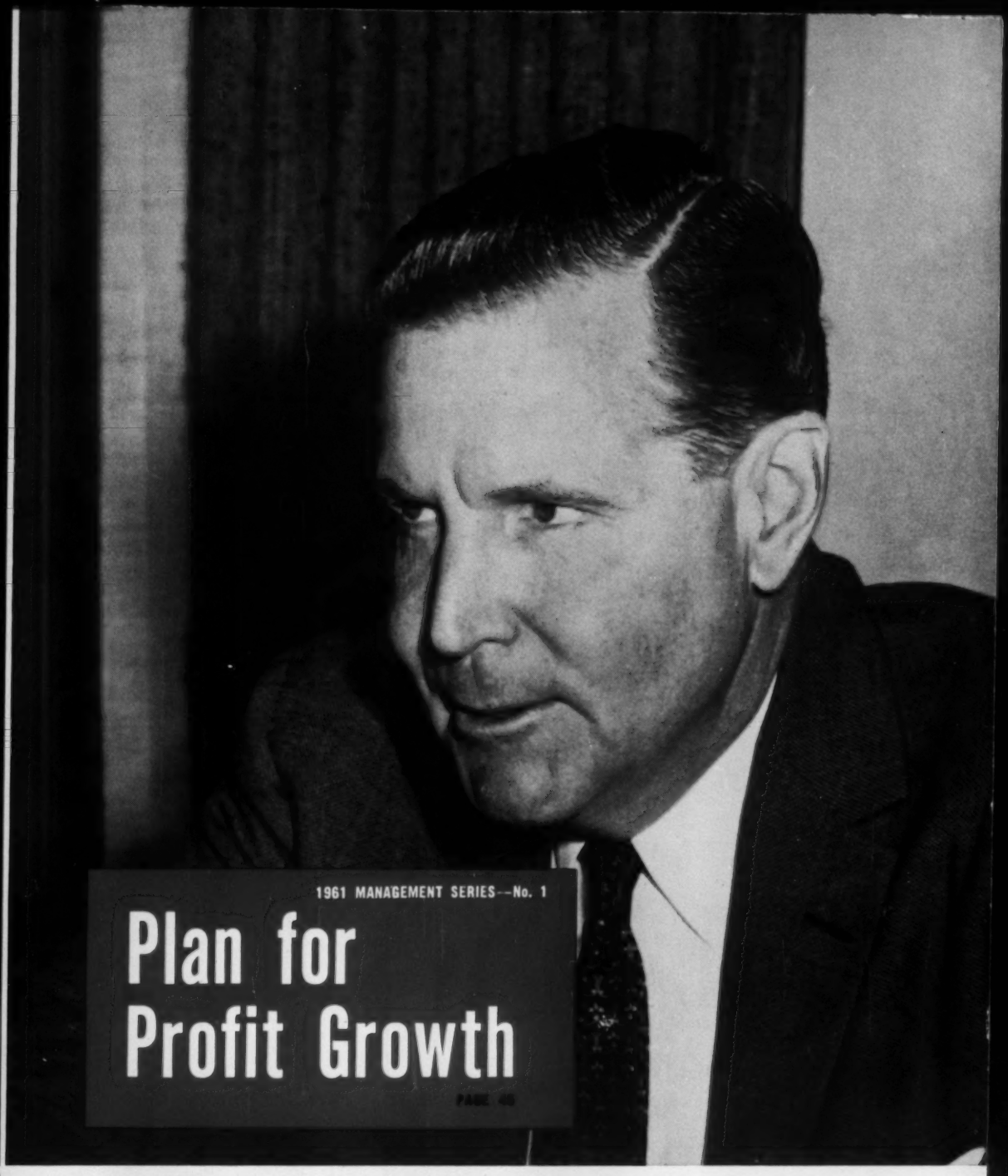
STEEL The Metalworking Weekly
A PENTON PUBLICATION
JANUARY 16, 1961



1961 MANAGEMENT SERIES—No. 1

Plan for Profit Growth

PAGE 45

DON G. MITCHELL, president, General Telephone & Electronics Corp.

What Chance for Depreciation Reform? 35
Ford Adopts Stainless Steel Muffler . . . 51
New Hobbers Lift Gear Quality 72
Ceramic Fibers Tackle Hot Jobs 74

METALWORKING WEEK—PAGE 17
COMPLETE CONTENTS—PAGE 19

EC&M *Fuseless* AIR-BREAK STARTER

GIVES Certified

100/150 MVA FAULT PROTECTION

NO SINGLE PHASING FROM BLOWN FUSES!

NO COSTLY REPLACEMENT FUSES TO STOCK!

- ✔ Gang-operated Disconnect Switches Grounded for Safety in Open Position. Mechanically Interlocked with Contactor... Never Open Under Load
- ✔ No Fuses. Bus Bars Throughout
- ✔ 3-way Door Interlock. On, Off and Open—with Positive Interlocking between Door, Disconnect and Contactor for Maximum Personnel Protection
- ✔ Heavy-duty DC Operating Magnet. No Chatter—No Hum

FRONT ACCESSIBLE WITHOUT ROLL-OUT!

Phase barrier and arc-chutes slide out. All starter parts exposed and accessible for easy inspection and maintenance

Get the complete story on certified fuseless fault protection for high-voltage motor drives. Write for Bulletin 8130A

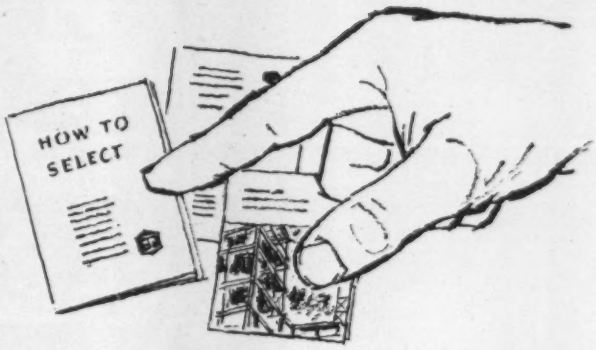
SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

wherever electricity is distributed and controlled

2635

LET YOUR STEEL SERVICE CENTER GIVE YOU A HAND...

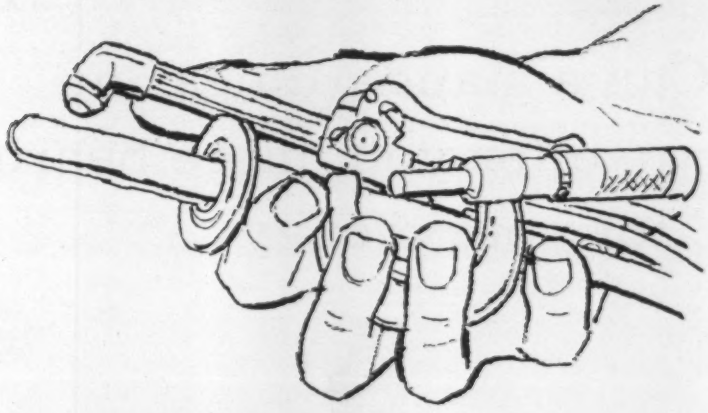


with Technical Assistance . . .

Whatever it is you want to know about selecting or fabricating steel, just ask your Steel Service Center. They work closely with steel producers on a great variety of problems.

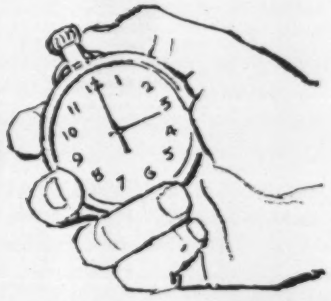
with Steel Inventory . . .

You can reduce your inventory costs, release tied-up capital, reclaim storage space when you use the large inventory of your Steel Service Center. Here you'll find ample stocks of Bethlehem plates, shapes, bars, sheets, tool steels, and alloy steels.



with Processing . . .

Your Steel Service Center will tailor your steel exactly to your needs. They are equipped for services such as flame-cutting, shearing, sawing, slitting, cutting, leveling, testing. You eliminate expensive handling equipment and labor.



with Meeting Production Schedules . . .

Quick delivery can be made by truck from most Steel Service Centers. And they'll set up delivery schedules to meet your production schedules. In emergencies, the steel you need can be rushed to the scene in a couple of hours.

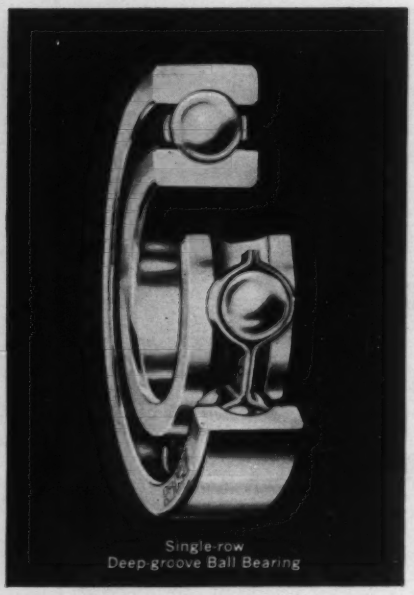
Steel

For strength
. . . economy
. . . eye-appeal

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

BETHLEHEM STEEL



Single-row
Deep-groove Ball Bearing

Can a standard bearing offer you "more bearing" for your money?

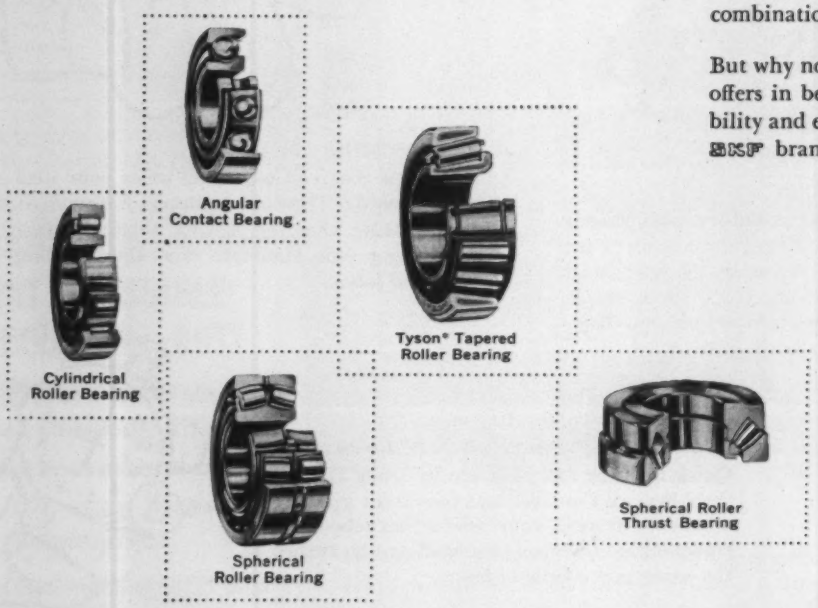
It can if it's made by SKF—because all SKF bearings, both ball and roller, offer special qualities at "production" bearing prices.

Take the single-row deep-groove ball bearing featured here, as an example. SKF designs and builds this type to sustain heavy radial load and thrust load in either direction. Furthermore, it is engineered to run smoothly and quietly at normal speeds with grease lubrication—and at high speeds with oil.

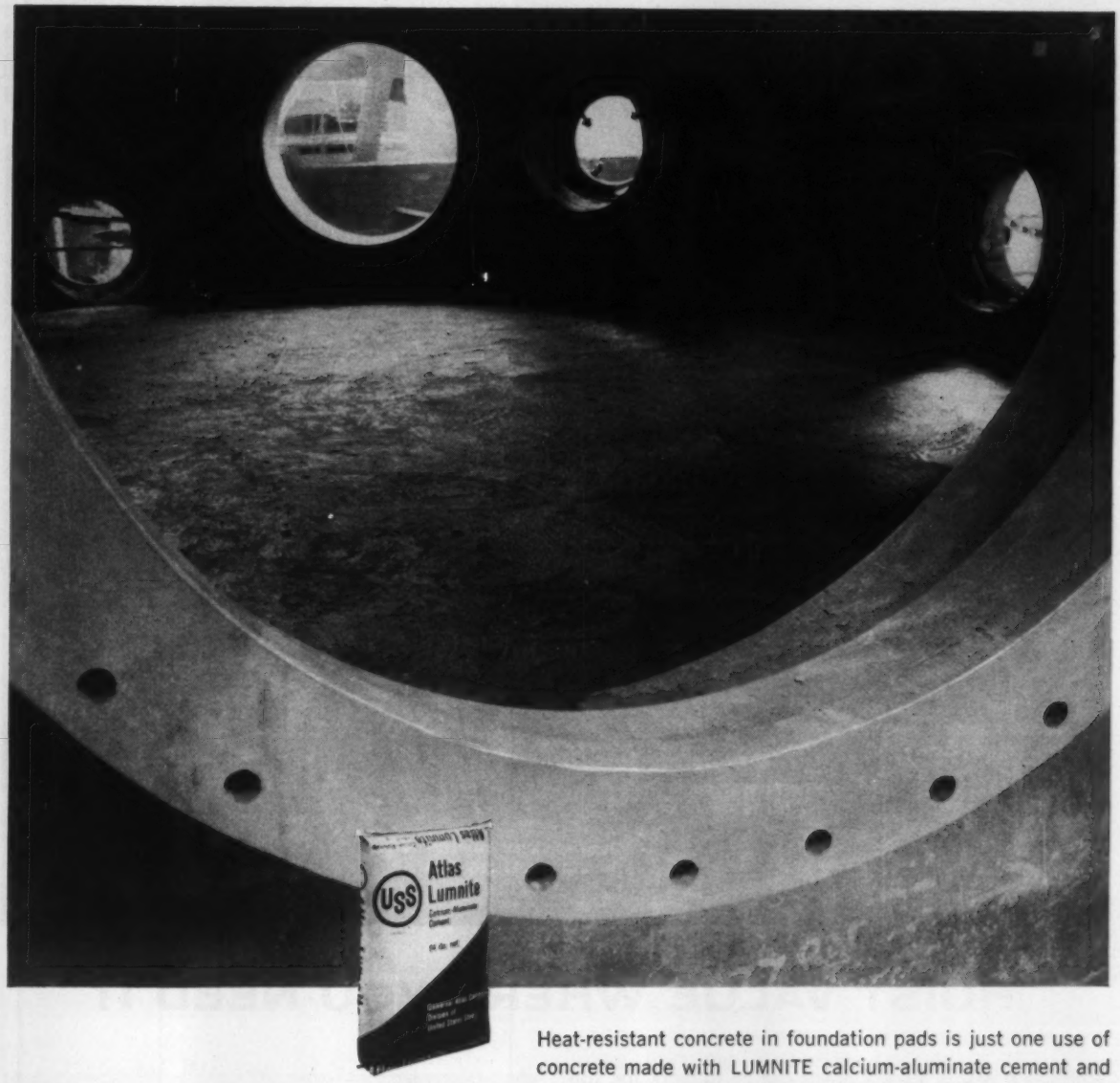
Yet this is a standard SKF ball bearing, mass-produced by automated production equipment at our plant at Altoona, Pa. You can quickly get this bearing in over 100 sizes, ranging from 5/8" to 15.748" O.D., and in a variety of seal, shield and snap-ring combinations.

But why not find out what SKF offers in bearing quality, availability and economy? Just call the SKF branch office nearest you

6001



Spherical, Cylindrical, Ball, Tyson Tapered and REED Miniature Bearings
EVERY TYPE—EVERY USE
SKF
SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.



Stove pads place easier with heat-resistant concrete

Heat-resistant concrete in foundation pads is just one use of concrete made with LUMNITE calcium-aluminate cement and aggregates in blast furnace stoves. Because it resists heat and abrasion, concrete made with LUMNITE cement can also be used to line sections connecting to hot-blast mains as well as flues, doors and stacks. In addition, it can be used as dome and wall insulation. And precast shapes can be formed, for doors and manholes. Installation is fast, easy, economical—by guniting, pouring or plastering. Concrete reaches full strength in 24 hours.

Write for detailed information on aggregates, proportions and methods of making concrete with LUMNITE cement: Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

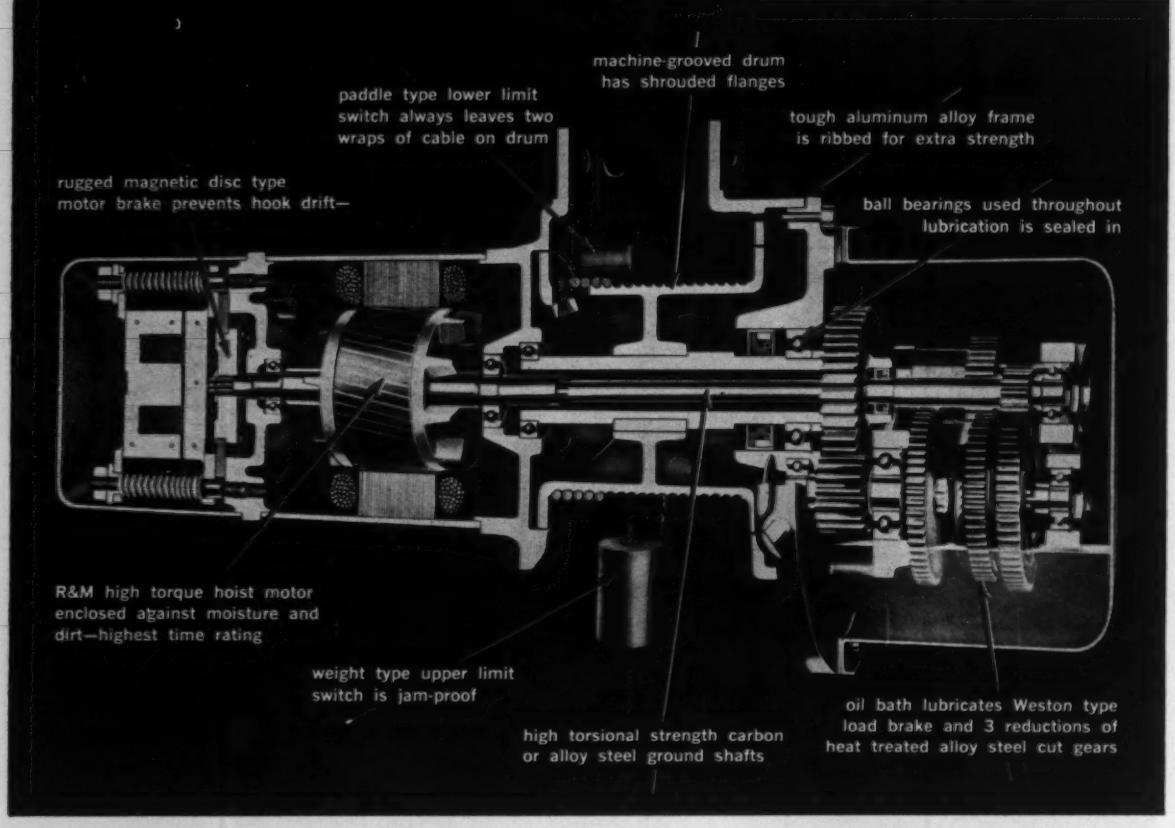
L-208

"USS," "Atlas" and "Lumnite" are registered trademarks

Universal Atlas Cement
Division of
United States Steel

Offices: Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco

HOISTS / CRANES


machine-grooved drum has shrouded flanges
paddle type lower limit switch always leaves two wraps of cable on drum
tough aluminum alloy frame is ribbed for extra strength
rugged magnetic disc type motor brake prevents hook drift—
ball bearings used throughout lubrication is sealed in
R&M high torque hoist motor enclosed against moisture and dirt—highest time rating
weight type upper limit switch is jam-proof
high torsional strength carbon or alloy steel ground shafts
oil bath lubricates Weston type load brake and 3 reductions of heat treated alloy steel cut gears

HOIST VALUE WHERE YOU NEED IT

Robbins & Myers Type J hoists can go to work for you this week. Since they are stocked near you, it's no trick at all to see—and benefit from R&M's superb design advantages. They give value beyond competitive price: *because* no other hoist has a higher rated, better protected motor (30 minute, 55° C. rise), *because* you get two brakes—a disc type motor brake and a Weston type load brake, *because* you get upper and lower non-jamming limit switches. Ball bearings are used throughout and the three reductions of heat treated alloy steel gears are lubricated in a sealed bath. Capacities—¼, ½, 1 and 2 tons; mounting—lug is standard, push, hand geared and motorized trolleys are available. Voltage is reduced at the push-buttons; control is magnetic. Request Bulletin 905 from the Hoist & Crane Division of Robbins & Myers, Inc., Springfield, Ohio or Brantford, Ontario.

ROBBINS & MYERS

hoists & cranes, Moyno® pumps, motors, Propellair® fans

The Lady Has a Question

Mary Borgerhoff, the lady to the left, is energetically waging the fight for women's rights. She is the proprietress of STEEL's "Men of Industry" department. She thinks the title discriminates against her sex because we're getting an occasional lady as a metalworking manager these days.

So she proposes that we change the name to "People on the Move." What do you think? Let us know.

Cliche Corner

We're getting a little tired of these business cliches. Have you any to add?

"An executive wears three hats. . ."

"Let's wait until the others show up. . ."

"Isn't it just a question of semantics?"

"Let's look at human relations:

H stands for heart
U stands for understanding
M stands for manager
A stands for art
N stands for nuts . . ."

Colorful Writing

Our editors strive for the fresh wording—but not too fresh. We're relieved to report that our alert copy scrutinizers, Harry Chandler and Glenn Dietrich, chopped these out of proposed stories:

"He has his neck way out on a limb."

". . . top brass take wing for greener pastures . . ."

"By midyear, there were some faint stirrings of bullishness beating in the breasts of titanium men."

But Messrs. Chandler and Dietrich were equally wise in allowing these to stay:

"Business forecasts and falling leaves fill the air these days, and they have one thing in common—direction." Nov. 14, 1960, p. 88.

"To put more meat in its bargaining stew, the UAW will maintain a strong strike fund." Jan. 2, p. 137.

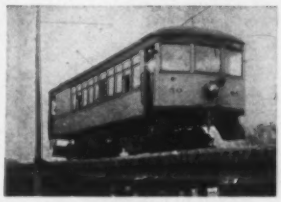
Part-time Professor

Harry Chandler, incidentally, has just been tapped by Western Reserve University in Cleveland to teach an evening course in business magazine editing.

Night Editor

While Harry's busy out on the campus at night, Geraldine will have more scope in the office. She's the cleaning woman on our floor, a frustrated writer, and self-appointed night editor.

We can now reveal that we learn more about editors and their mysterious doings from Geraldine than from the editors themselves. We believe she gets most of her data from waste baskets. Samples:



Assistant Editor Derry Eynon, a trolley fan, is considering spending part of his vacation next summer riding the Charles City Western, one of the last of the interurban lines, which still rattles between Colwell and Marble Rock, Iowa, via Charles City (see photo).

Assistant Editor Alfred Castelnau is the son of a French chef, but he claims he hasn't inherited his father's culinary talents. His wife does the cooking.

Associate Managing Editor Vance Bell has ended a 14 year holdout and acquired a television set.

There's Still Time . . .

. . . to enter STEEL's Usership Idea of the Month Contest. Deadline for the final contest (December) is Feb. 1, 1961. For rules, see the Servicenter, Pages 5 and 6 in any December issue. You might win $1000.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

TO FIND THE MAN YOU NEED...

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking.

STEEL
The Metalworking Weekly

STEEL
The Metalworking Weekly

Editor-in-Chief, IRWIN H. SUCH

Editor, WALTER J. CAMPBELL

Associate Managing Editors, VANCE BELL, JOHN S. MORGAN

WILLIAM E. DEAN .....News Editor
WILLIAM M. ROONEY .....Market Editor
ROBERT F. HUBER .....Machine Tool Editor
EDWARD N. CASE .....Metallurgical Editor
HARRY CHANDLER .....Copy Editor
GLENN W. DIETRICH ..Associate Copy Editor
FRANK R. BRIGGS .....Associate Editor
ROBERT O. JAYNES .....Associate Editor
ROSS WHITEHEAD .....Associate Editor
GEORGE J. HOWICK .....Associate Editor
NEIL C. ROBERTS .....Associate Editor
DONALD E. HAMMERSTROM..Associate Editor
DERRY EYNON .....Assistant Editor
JOHN TERESKO .....Assistant Editor
ALFRED M. CASTELNAU .....Assistant Editor
MARY T. BORGERHOFF .....Assistant Editor
EILEEN CORTES .....Assistant Editor
MARY ANN STUVE .....Editorial Assistant

SUE MOORE, Editorial Assistant

THOMAS H. BRYAN, TOM WELSH, Art Editors

IRENE KASNER, Editorial Service

Resident Editors

New York 17 .....60 E. 42nd St.
B. K. PRICE, L. E. BROWNE
BRIAN WILSON, REED TRASK
Murray Hill 2-2581

Chicago 11 .....520 N. Michigan Ave.
ERLE F. ROSS, AUSTIN E. BRANT
Whitehall 4-1234

Pittsburgh 19 .....2837 Koppers Bldg.
WILLIAM V. WALLACE—Atlantic 1-3211

Detroit 35 .....15800 W. McNichols Rd.
A. DONALD POSTMA—Broadway 3-8150

Washington 4 ....1123 National Press Bldg.
JOHN R. BOTZUM—Executive 3-6849

Editorial Correspondents

Buffalo—Emerson 5385 ....GEORGE E. TOLES
Youngstown—Riverside 7-1471..GEO. R. REISS
Cincinnati—Beechmont 1-9607...DICK HAVLIN
Birmingham—Fairfax 3-5381..IRVING BEIMAN
St. Louis—Garfield 1-1212 HAMILTON THORNTON
Houston—Republic 4-5766 ..LOUIE E. MATHIS
Los Angeles—Webster 5-1234..NORMAN LYNN
San Francisco—Exbrook 7-5700 EDWIN HAVERTY
Seattle—Melrose 2-1895 .....R. C. HILL
Toronto, Canada—Oxford 4-6755..F. S. TOBIN
Birmingham, England .....J. A. HORTON
Brussels, Belgium .....PAUL DE KEYSER

Dusseldorf, Germany, DR. HERBERT GROSS

BUSINESS STAFF

Business Manager, S. F. MARINO

Advertising Director ....C. A. TALLINGER JR.
Advertising Service Mgr. ...DORIS MITCHELL
Production Manager .....A. V. ANDERSON
Promotion Manager ....THOMAS J. HARMON
Classified Advertising .....EVELYN DIETZ
Market Research Mgr. ....T. M. BALLANTINE
Circulation Director .....J. C. GERNHARD
Circulation Manager .....P. B. KEEFE
Distribution Manager .....G. R. EBERSOLE
Reprints .....JUNE SCHILENS

Advertising Representatives

New York 17 .....60 E. 42nd St.
K. A. ZOLLNER, GUY LABAW
Murray Hill 2-2581

Wynnewood, Pa. (Phila.) 200 Wynnewood Ave.
WM. J. VERSCHOOR—Midway 2-6512

Farmington, Conn. .....12 Farmstead Lane
CALVIN FISHER JR.
Orchard 7-1756

E. Rochester, N. Y. .....217 Ridgeview Dr.
HAROLD A. DENNIS—Browning 1-2105

Pittsburgh 19 .....2837 Koppers Bldg.
JOHN E. MacARTHUR—Atlantic 1-3211

Cleveland 13 .....Penton Bldg.
J. K. GILLAM, N. W. MANNING
JOHN B. KELLY
Main 1-8260

Cincinnati 6 .....2215 Victory Parkway
E. L. FRANKE—Parkway 1-0711

Detroit 35 .....15800 W. McNichols Rd.
DONALD C. HYDE
Broadway 3-8150

Chicago 11 .....520 N. Michigan Ave.
W. L. POLAND, WM. J. D'ALEXANDER
RICHARD BIRDSONG
Whitehall 4-1234

Los Angeles 36 .....5943 W. Colgate Ave.
F. J. FULLER—Webster 1-6865

San Francisco 4 .....57 Post St.
Robert W. Walker Co.—Sutter 1-5568

Birmingham 9 .....249 La Prado Place
FRED J. ALLEN—Tremont 1-8598

Clearwater, Fla. .....1954 Jeffords Dr.
H. G. ROWLAND—(Clearwater) 31-4121

Dallas 35 .....818 Exchange Bank Bldg.
JAMES H. CASH—Fleetwood 1-4523

BPA

NBP

Published Every Monday by
THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio
MAin 1-8260

GEORGE O. HAYS .....Chairman
RUSSELL C. JAENKE .....President
FRANK G. STEINEBACH .....Vice Pres. and Secretary
FRANK O. RICE .....Vice President
JOSEPH P. LIPKA .....Vice Pres. and Treasurer
DAVID C. KIEFER .....Vice Pres.—Marketing

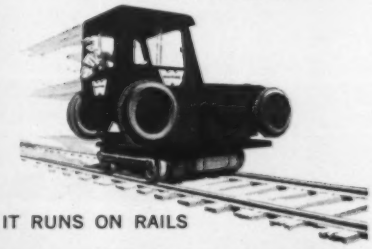
Also Publisher of
FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST, AUTOMATION
Member of Business Publications Audit of Circulation Inc., Society of Business Magazine Editors, and National Business Publications Inc.

THE ADVENTURES OF Tricky THE TRACKMOBILE®

WHEREIN TRICKY DISCOVERS HOW USEFUL HE CAN BE TO YOU

There just isn't anything like a Trackmobile®. It runs on rails. It runs on the road. This duality makes it an ambidextrous vehicle of all work that can pull or push loaded rail cars and then get out from in front of them. It can plow snow; it can switch—actually it takes a book to describe all the things a Trackmobile can do. So we've published one. "Tricky the Trackmobile" is a story that will delight you and delight the kids too. Your copy is free for the asking. If you want to find out how you can drastically cut handling costs in your plant send for "Tricky the Trackmobile" today. Write: Whiting Corporation, 15643 Lathrop Avenue, Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.

IT RUNS ON WHEELS



IT RUNS ON RAILS

Write for: "Tricky the Trackmobile"—
a full color cartoon book compliments of Whiting.

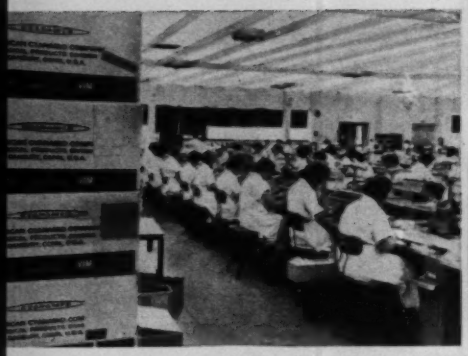
See Our Catalog in SWEETS 90 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

TRACKMOBILE®

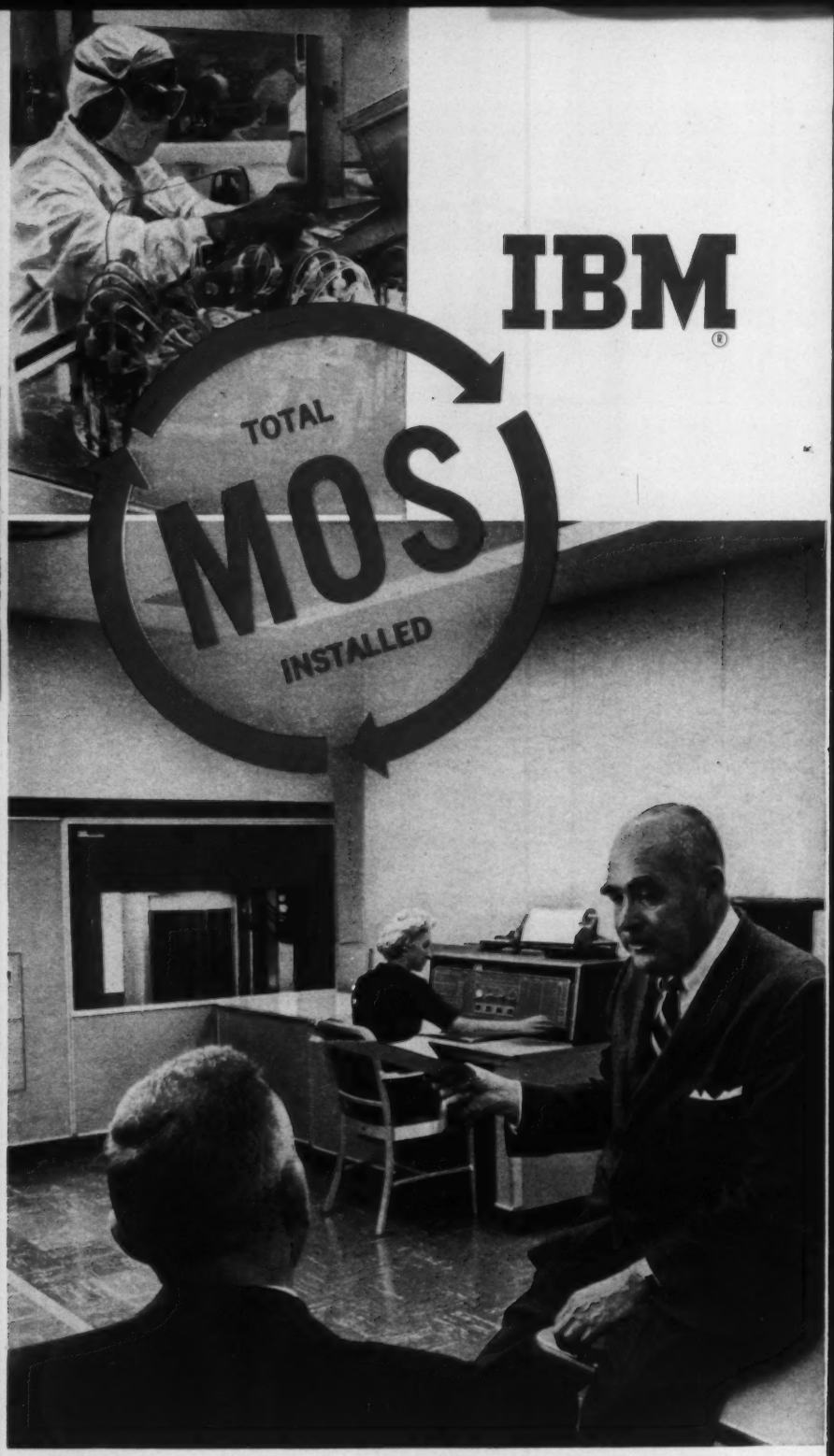
WHITING

MANUFACTURERS OF CRANES; TRAMBEAM® HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES®; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT

No personnel shortages–MOS lets management know on a periodic basis what the future requirements will be for materials and personnel.



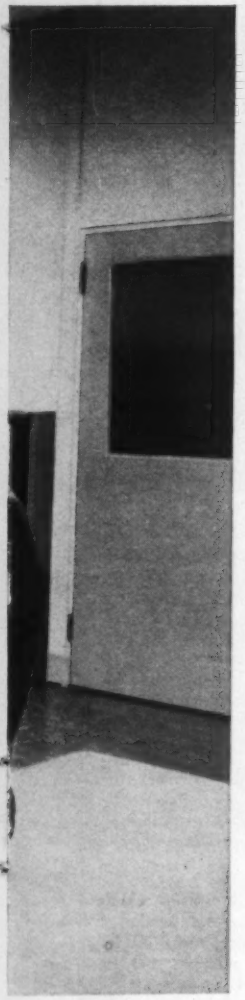
No product shortages–Periodic reports from RAMAC guarantees that American Cyanamid has adequate inventories at all times.



No delays in getting the facts–Mr. Henry Wendt, Jr., General Manager of American Cyanamid's Surgical Products Division, gets up-to-the-minute information with the help of the IBM RAMAC 305 Data Processing System.

Management Operating System

at American Cyanamid's Surgical Products Division



...speeds service through automatic inventory control

The *Surgical Products Division* of American Cyanamid Company handles over 1700 individual items at 43 locations. They now have continuous *automatic* control over manufacturing, inventory, and distribution.

This is accomplished by a new dynamic technique—IBM Management Operating System. Using IBM RAMAC® equipment, MOS coordinates planning and control functions continuously throughout the manufacturing cycle. MOS supplies accurate data in time for effective management decisions.

MOS automatically *inter-relates* the six major manufacturing control functions:

1. Sales Forecasting
2. Materials Planning
3. Inventory Management
4. Plant Scheduling
5. Work Dispatching
6. Operations Evaluation

Previously, updating of all this information had taken weeks. The result was a high back order position coupled with an excessive investment in inventory. It also made it difficult to schedule and operate the plant at the highest economy level.

Today, American Cyanamid's MOS provides current control on all phases of production, distribution and manufacturing. It gives management all the information needed to cut back orders, to reduce inventory investment, and to increase plant efficiency.

MOS offers comprehensive control

Only with the total approach provided by MOS can you get such coordinated effort, such complete information, such tight operational control. Only with MOS can you study *in advance* the effects of the decisions yet to be made.

For more complete information call your local IBM office.

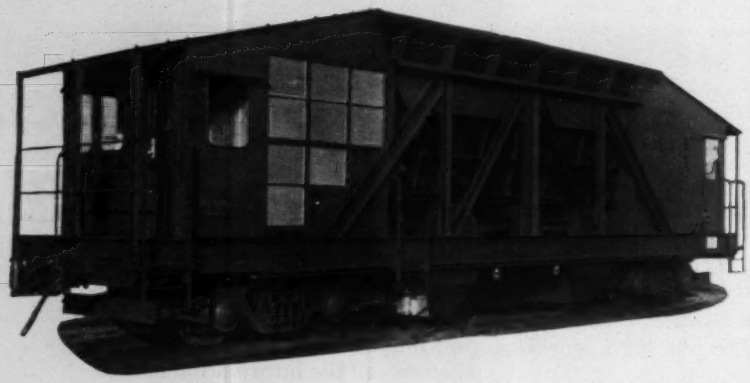
IBM® DATA PROCESSING

. . . custom built

ATLAS

diesel-electric

ORE-TRANSFERS



75-ton diesel-electric transfer, single hopper, bottom dump with air-operated discharge gates and double-end control.

Atlas builds steel plant cars to fit the exacting needs of each user. And each is constructed with the simplicity and ruggedness that defies obsolescence.

SINCE 1896 . . .

Producers of Scale Cars, Ore-Transfers, Coal Larries, Door Machines, Coke Quenchers . . .

ATLAS CAR & MFG. CO.

Since 1896

1100 Ivanhoe Rd. • Cleveland 10, Ohio

CALENDAR OF MEETINGS

Jan. 19-21, Southern Industrial Distributors Association: Midyear meeting, Palm Beach Biltmore Hotel, Palm Beach, Fla. Association's address: 1626 Fulton Bank Bldg., Atlanta 3, Ga. Secretary-treasurer: E. L. Pugh.

Jan. 23-24, Industrial Heating Equipment Association Inc.: Winter meeting, Dearborn Inn, Dearborn, Mich. Association's address: Association Bldg., Washington 6, D. C. Executive vice president: Robert E. Fleming.

Jan. 23-26, Plant Maintenance Show: International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 30-Feb. 3, American Society for Testing Materials: Committee week, Netherland-Hilton, Cincinnati. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Thomas A. Marshall Jr.

Jan. 31, Steel Kitchen Cabinet Manufacturers Association: Annual meeting, Sheraton Towers Hotel, Chicago. Association's address: 910 Park Bldg., Cleveland 14, Ohio. Executive secretary: Sanford Curtiss.

Feb. 5-9, Associated Equipment Distributors: Annual convention and exhibit, Biltmore and Statler Hotels, Los Angeles. Distributor's address: 30 E. Cedar St., Chicago 11, Ill. Executive secretary: P. D. Hermann.

Feb. 10-12, American Electroplaters Society: Interim meeting, Statler-Hilton Hotel, Hartford, Conn. Society's address: 445 Broad St., Newark 2, N. J. Executive secretary: John P. Nichols.

Feb. 13-15, American Management Association: Personnel conference, Palmer House, Chicago. Association's address: 1515 Broadway, New York 36, N. Y.

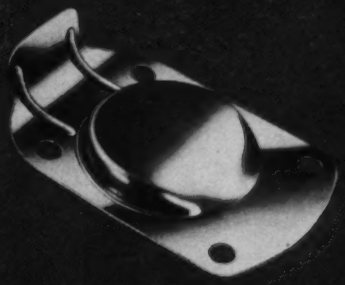
Feb. 15-17, American Management Association: Marketing conference, Hotel Roosevelt, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Feb. 16-17, National Industrial Conference Board Inc.: General session for all associates, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y.

Feb. 20-22, American Management Association: General management conference, Hotel Olympic, Seattle. Association's address: 1515 Broadway, New York 36, N. Y.

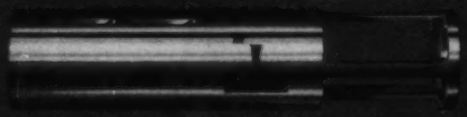
Feb. 23, Cutting Tool Manufacturers Association: Annual meeting, Harmonie Club, Detroit. Association's address: 1001 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

you can blank it...



you can forge it...

you can polish it...



but you can never, no never, change its **consistent uniformity!**

...and that means maximum production, accurate conformity to specifications, fewer rejects and increased profits with Carpenter Specialty Stainless ...produced by one of the leaders of stainless steels for industry.

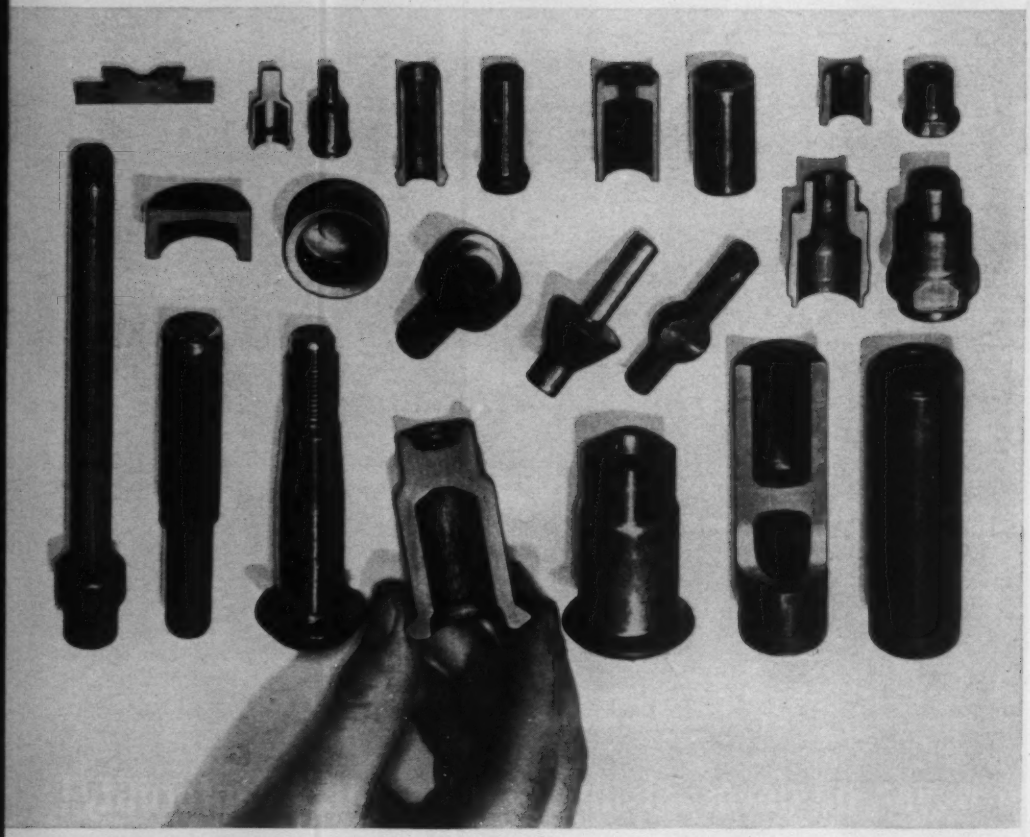
***Carpenter* steel**

you can do it ***consistently*** better with Carpenter Stainless Steels for specialists

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

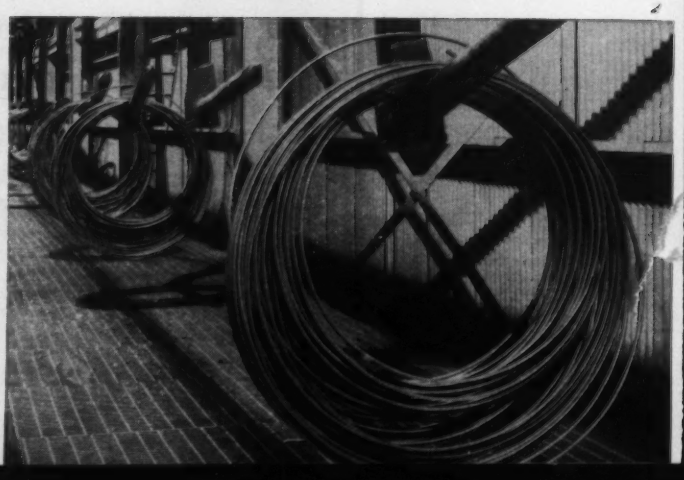
From the industry's most advanced bar mill...

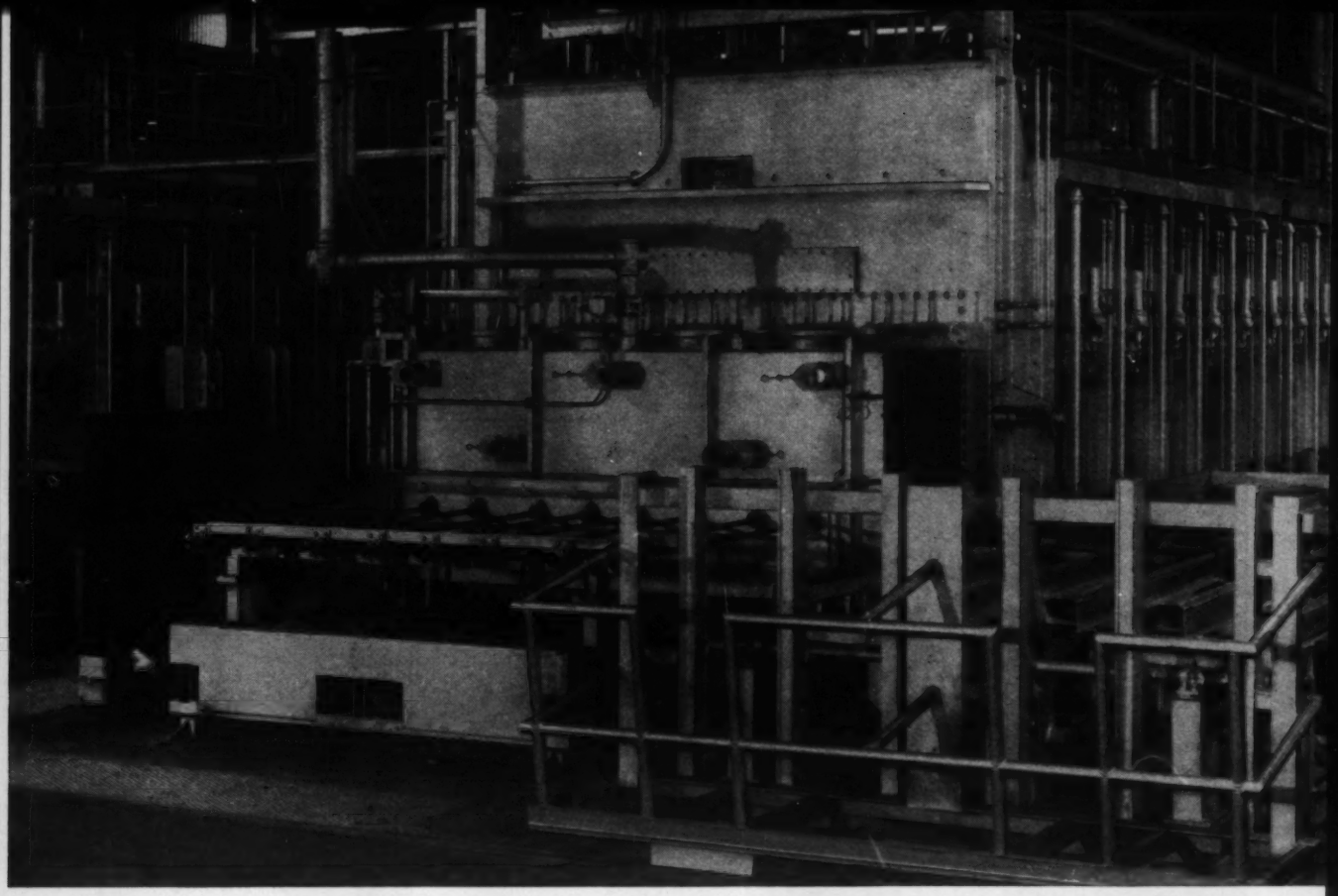
REPUBLIC STEEL FOR COLD EXTRUSION



THE COLD EXTRUSION PROCESS virtually eliminates raw material waste. Standard equipment is available so that retooling costs are not excessive. Bars produced on this 11″ mill have denser, more uniform structures because they undergo more hot work. A larger than usual billet—3″ or 4″ square—is rolled to finished products of standard sizes.

HEAVIER COILS weighing up to 1600 pounds mean fewer fabrication changeovers, less scrap loss. High speed coilers handle the complete range of bars produced (⅜″ to 29/64″—700 to 900 pounds; ⅝″ to 1½″—1400 to 1600 pounds). Each coil undergoes ultra-precise inspection to assure conformance to specifications, then is double banded for safe, efficient handling.





Annealed, normalized, or spheroidized to your precise specifications

Atmosphere controlled, continuous annealing furnaces give Republic's new 11″ bar mill maximum annealing capacity. Steel for cold extrusion or cold heading can be furnace-treated, finished, and delivered to your precise specifications. The mill has facilities to pickle, oil, lime, or phosphate coat.

Depending on the nature of your product, you may find it more advantageous to use steel in the cold finished form. Either way, our metallurgists will help you select and apply the most economical bar product—carbon, alloy, or stainless—capable of meeting your requirements.

Republic Steel is the nation's largest producer of steel for cold extrusion. For complete data, contact your nearest Republic representative or mail the coupon below. Please indicate if you would like a metallurgist to call.

Strong, Modern, Dependable

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. ST-1514
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on:

☐ Steel for cold extrusion ☐ Steel for cold heading
☐ Steel for cold forging ☐ Have a metallurgist call

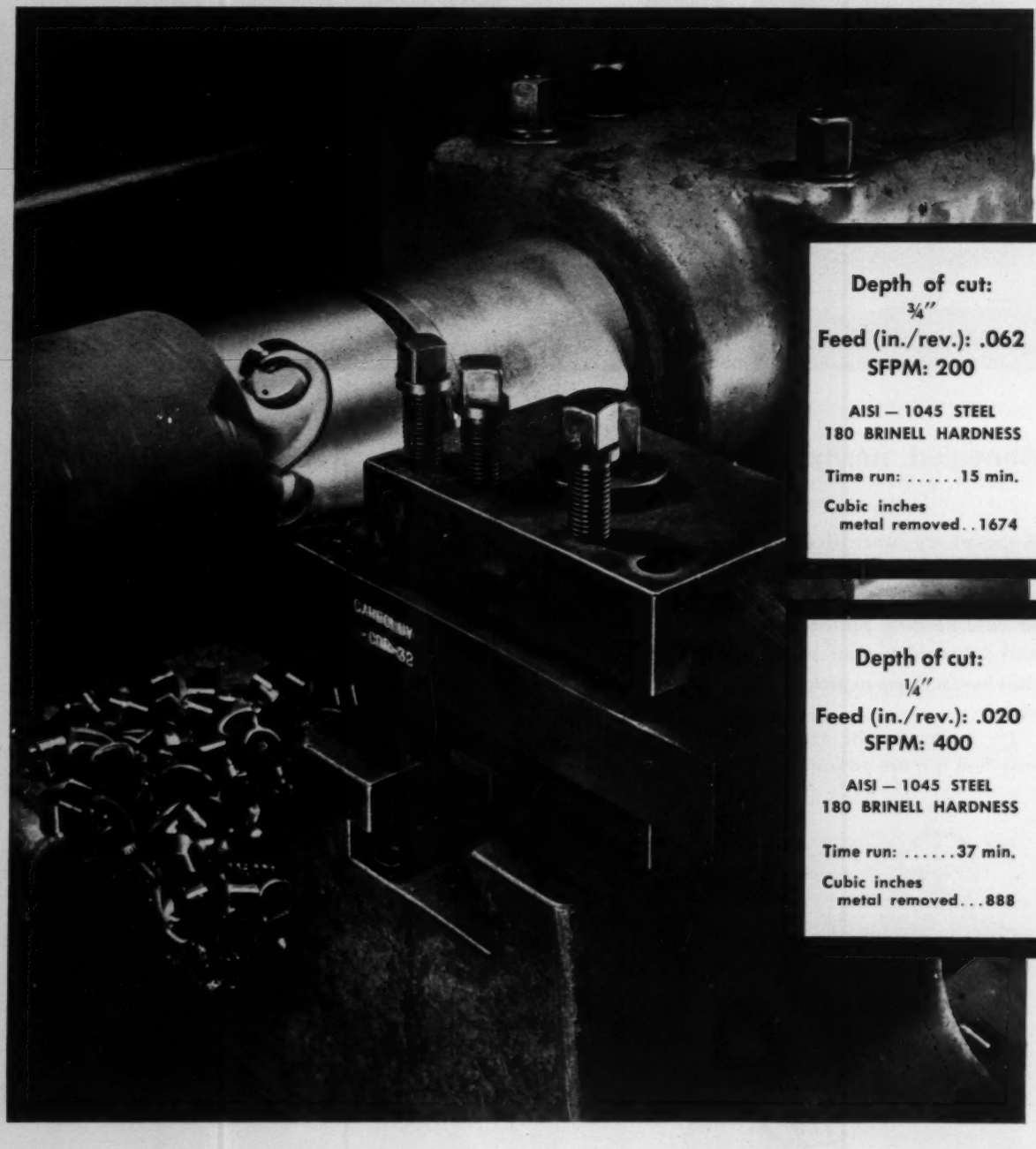
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Why ?



Depth of cut:
¾"
Feed (in./rev.): .062
SFPM: 200

AISI — 1045 STEEL
180 BRINELL HARDNESS

Time run: .....15 min.

Cubic inches metal removed..1674

Depth of cut:
¼"
Feed (in./rev.): .020
SFPM: 400

AISI — 1045 STEEL
180 BRINELL HARDNESS

Time run: .....37 min.

Cubic inches metal removed...888

Why is one Carboloy® carbide grade best for light-duty steel-cutting applications; another more suitable for heavy-duty jobs? And which should you use?

Carbide selection can be scientific (and *should* be!) if you are going to get optimum results from your steel-cutting operation.

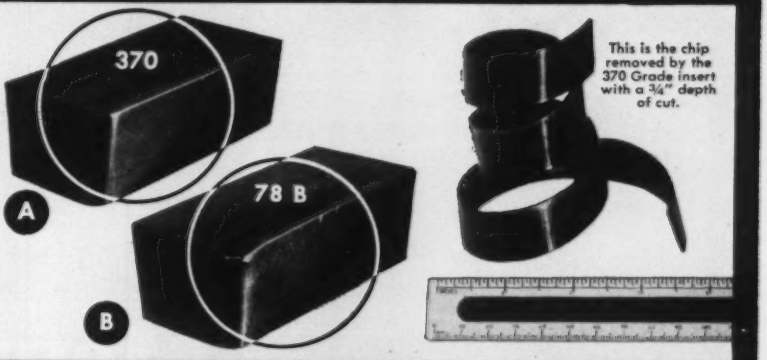
Take the job-graded Carboloy Grades 78B* and 370, for example. The 78B Grade is designed to offer real economy in normal steel-cutting applications—where machine power is limited. The 370 Grade, on the other hand, was developed specifically for heavy-duty steel-cutting jobs. Look over the following examples; then contact your Carboloy representative, or Authorized Carboloy Distributor, for information on Carboloy *job-graded* carbides for your specific operation. Take advantage of *better profits through better tooling.* Call today, or write: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Blvd., Detroit 32, Michigan.*

*Carbides in 78 Series are all pre-honed. Carbides in the 300 series are available pre-honed, precision-ground, or utility-ground.

HEAVY-DUTY MACHINING

Photograph A shows the Carboloy 370 Grade insert after the run. Wear land was only .012", and there is no deformation (upsetting) of the cutting edge. Photo B shows the 78B Grade insert after the same run. Note the deformation of the cutting edge . . . Grade 78B was not designed for such severe cutting pressures.

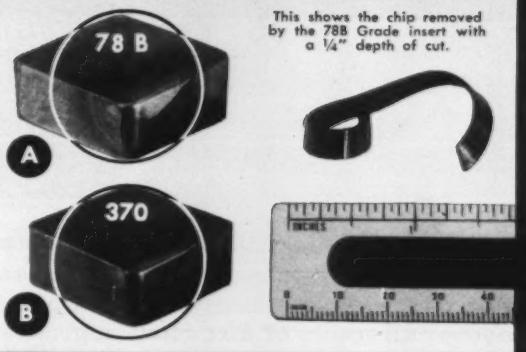
CONCLUSION: *In this heavy-duty application, Carboloy 370 Grade is recommended.*



LIGHT-DUTY MACHINING

In this light-roughing application there is little visible difference between the Carboloy 78B Grade insert (Photo A) and the 370 Grade insert (Photo B). Because 78B Grade is job-graded for light- and medium-roughing applications, it will wear as long as 370 Grade. Grade 78B insert is lower in initial cost, so in this case it makes good sense to use Grade 78B. In this example, the wear land on 78B insert was only .010".

CONCLUSION: *In this normal steel-cutting application, Carboloy 78B Grade is recommended.*

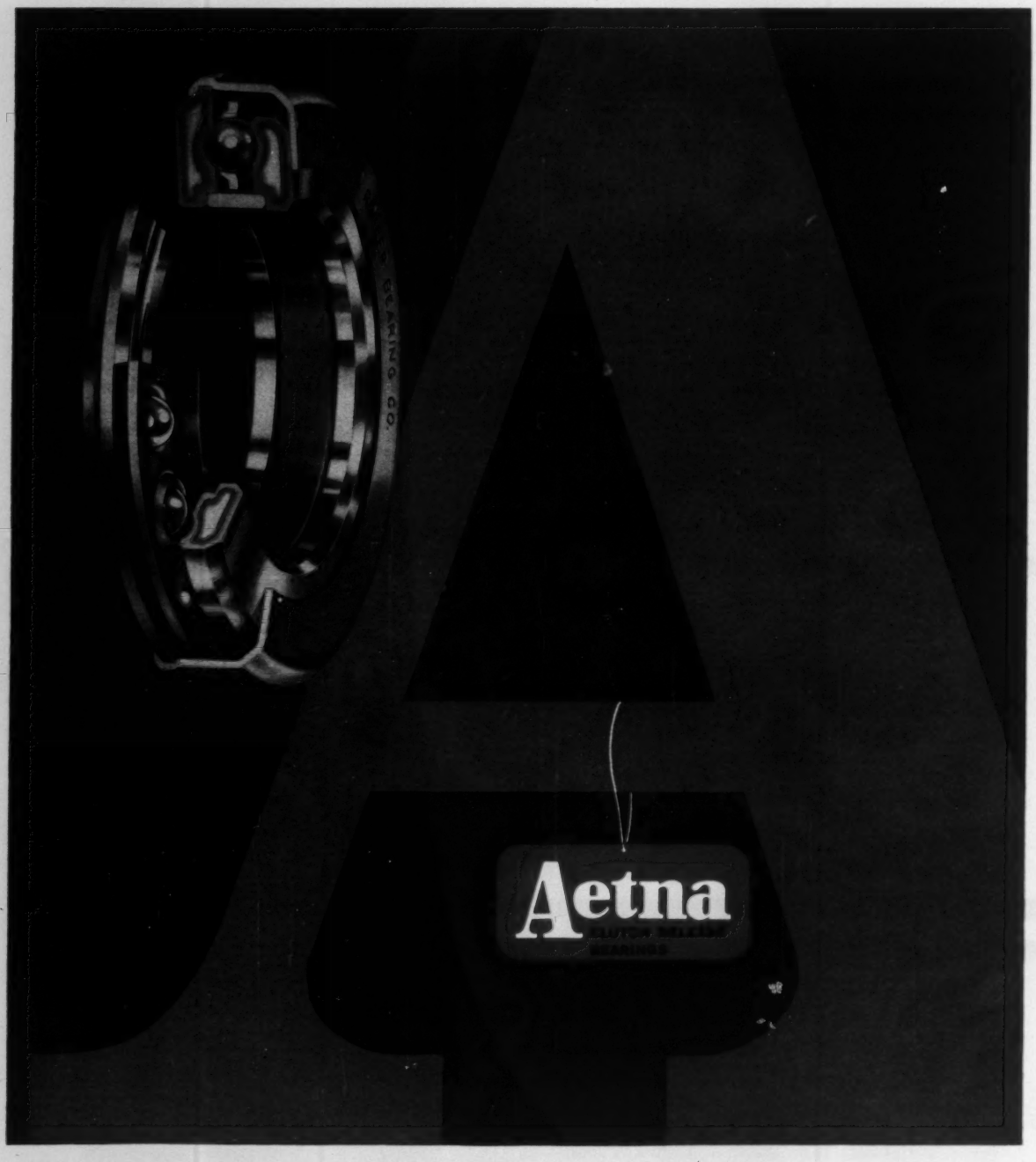


CARBOLOY® CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS



LISTEN . . . THEY'RE SO QUIET Put an Aetna bearing to the noise test and listen. Aetna bearings are quiet. They run smoothly and silently on and on without a trace of crackling or whine. This is because Aetna bearings are sound tested under prescribed load to uncover all traces of dirt, chatter, groove wobble, tight cage, and other imperfections. Sound testing is an important part of our quality control. And it assures you of consistently dependable bearing performance for your applications. For information on the complete line of Aetna ball and roller bearings, call your Aetna representative listed in your classified directory or write for General Catalog and Engineering Manual.

AETNA BALL and ROLLER BEARING COMPANY | 4600 SCHUBERT AVE.
DIVISION OF PARKERSBURG-AETNA CORPORATION | CHICAGO 39, ILL.

ANTI-FRICTION SUPPLIERS TO LEADING ORIGINAL EQUIPMENT MANUFACTURERS SINCE 1916

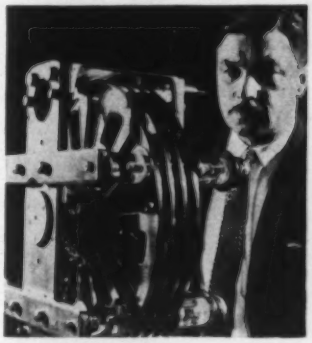
Armco's Johnston Sees Uptrend

"We believe that steel production in the coming months will move considerably above its present level. Although the upturn will be gradual, the first quarter of '61 will show a definite improvement over the last quarter of '60 . . . Steel consumption in '61 will total about the same as in '60, but production will be more closely related to usage, resulting in a better quarterly balance." So predicts Logan T. Johnston, president, Armco Steel Corp., who backed his confidence with an announcement that his firm's capital spending this year will total $100 million—vs. $60 million last year.

Price Fighting Rages in Steel

The pressure of excess capacity has forced a rash of price cutting in the steel industry. The main offenders are apparently seven smaller firms. They are granting large reductions to warehouses, which in turn peddle the products at below-mill prices. Examples of cutting STEEL discovered last week: 4000 tons of cold rolled sheets were offered for February delivery, to the customer's size (no scrap loss), at $14 a ton under the mill price . . . On 1000 tons of rods, chemical extras were waived . . . Tubing mills west of the Great Lakes were taking orders in Cleveland at reduced prices . . . A Toledo warehouse made deliveries in Chicago and Kansas City at reduced prices.

Power Source for Spaceships



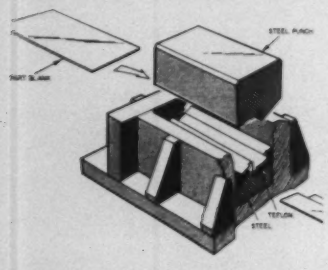
High voltage current for space vehicles may spin off the glittering rotor of an electrostatic generator like this one developed by Goodrich-High Voltage Astronautics Inc., Burlington, Mass. The weight penalty inherent in boosting vehicles into space is reduced because the high vacuum in space provides a natural insulation for such generators, says A. John Gale, GHVA president.

Planning Group Urges Faster Growth

The steering committee of the National Planning Association is urging that policies be adopted to step up the annual growth rate of our gross national product from 2.6 per cent to a sustained rate of 4.5 per cent. Such policies would be "more aggressive than those pursued in the past" but would still be "compatible with U. S. political and social institutions," NPA asserts. It

says a continuation of our present growth rate would leave us with unemployment at 10 per cent of the labor force in 1963. The group urges top priority for programs such as these: 1. Promptly increase national security programs. 2. Intensify and expand programs in education, health, housing, community facilities, and urban renewal. 3. Strengthen unemployment benefits. 4. Adopt special measures for distressed areas. 5. Speed up the adoption of technological advances and scientific management. 6. Determine whether a better depreciation reform program can be found and adopted. 7. Improve training and mobility of the work force. 8. Curtail labor practices that are serious obstacles to growth. 9. Prevent the abuse of economic power.

Teflon-Insert Die Tames Toughies



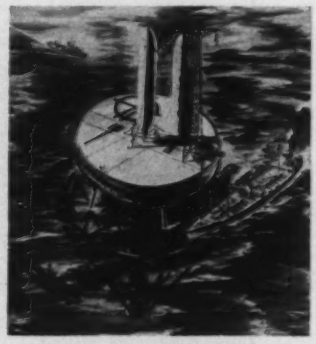
Chance Vought Corp.'s Aeronautics Div., Dallas, is using a layer of Teflon as the bottom die face in forming stainless for advanced aircraft and space vehicle projects. The technique eliminates guide pins and die matching; interchangeable punch and die inserts cut costs. For more information about the technique, see Page 87.

Ely Sees Sales Increase in Laundry Appliances

C. G. Ely, chairman of the American Home Laundry Manufacturers' Association and vice president-marketing of Maytag Co., estimates that sales of home laundry appliances this year will be about 5 per cent higher than than they were in 1960. He looks for the largest unit increase to come in automatic washers and the largest percentage increases to be claimed by dryers (gas up 9 per cent and electric up 5 per cent) and washer-dryers (up 23 per cent).

How to Launch a Nuclear Rocket—at Sea

Aerojet-General Corp. has proposed a solution to launching large chemical and nuclear rocket boosters. The firm's Prop (for planetary rocket ocean platform) is a bouyant sea base for fabricating, assembling, static testing, and launching large rockets or space vehicles. Personnel would be evacuated by submarine after a launching to avoid exposure to radioactive contamination. The artist's sketch shows a nuclear ship 40 ft in diameter and 300 ft long ready for launching.

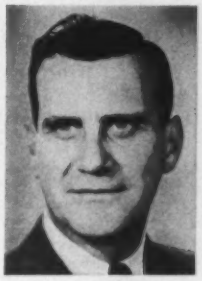


Consumers Remain Fairly Confident

From January to May of last year, consumer optimism weakened to about the same extent it did in the first half of 1957. During the second half of '57, attitudes worsened rapidly. Not so during the second half of 1960. The latest report by the University of Michigan's Survey Research Center shows that consumer attitudes in November were on a par with May's. The center's

index of attitudes and inclinations to buy stands halfway between the peak of optimism registered in 1955-56 and the low point reached in early 1958.

Communications Will Help Ore Industry Solve Its Problems



"We must do a better job of communicating within our organizations and on the outside too. Many of our problems can be solved more easily and quickly if our employees and the public understand them and help work toward their solutions." That was the remedy prescribed for the economic plight of the Lake Superior ore industry by Robert J. Lenney, president, Reserve Mining Co., Silver Bay, Minn., at last week's mining symposium in Duluth.

UAW Proposes Closedowns

The United Auto Workers has proposed periodic, full week closedowns to the Big Three carmakers in place of large layoffs or short workweeks when production cutbacks are necessary. The closings would permit workers to collect unemployment benefits.

Thunderbird to Get Stainless Muffler

A modified 410 stainless steel that costs about a third less than the conventional product is being used for critical inner parts of Thunderbird mufflers. It's the first use of a stainless muffler on any present production car (Page 51).

Head of Steel Founders Sees High Production

"U. S. production of steel castings should stay at about the same level in 1961 as in 1960 (1,413,000 tons), despite a relatively slow start," Wilson H. Moriarty, president, Steel Founders' Society of America, told STEEL. The senior vice president of National Malleable & Steel Castings Co. says closer dimensional tolerances (to save weight and reduce machining) will be one of the industry's marked trends in 1961. He also notes that wider use of heat treating is bringing about stronger steel castings. Some materials being cast have tensile strengths up to 300,000 psi, he says. About 15.6 per cent of the steel cast during 1960 had a tensile strength of more than 90,000 psi. Mr. Moriarty will describe the steel foundry industry's first 100 years this Thursday at Franklin Institute, Philadelphia, before the Newcomen Society of North America.

Congress Will Probe Air Pollution in Steelmaking

A Congressional subcommittee has tentatively scheduled spring hearings in Cleveland, St. Louis, Birmingham, New Orleans, and California to investigate air pollution. One aspect will be possible pollution stemming from use of oxygen lances in open hearths. At press time, the Air Pollution Committee of Cleveland's City Council insisted that Republic Steel Corp. should not operate the two furnaces it is converting to the lance process, without first installing air pollution controls. Jones & Laughlin Steel Corp.'s Cleveland Works has been

STEEL
The Metalworking Weekly

January 16, 1961 Vol. 148 No. 3

CONTENTS

THE EDITOR'S VIEWS:
Let's Back Kennedy! 31

WINDOWS OF WASHINGTON:
Congress May Aid Small Business .42

MIRRORS OF MOTORDOM:
Thunderbird Gets Stainless Muffler .51

THE BUSINESS TREND:
1961: Slow Start, Fast Finish 55

NEWS SECTION:
What's Ahead for Depreciation? ..35
Legislation: Joint Labor-Steel Pact .36
Professor Assesses Labor Outlook .37
Screw Machine Product Sales Dip .38
Electrical R&D Outlays Set Pace ...39
Program for Management—Profit Growth—No. 1 in series 45
Reserve Capacity Needs Reduced ..66

TECHNICAL SECTION:
Technical Outlook 71
New Hobbers Help Lift Gear Quality 72
Ceramic Fibers Get Hot Jobs 74
Adhesive Bonded Tubing Promising 76
Hoppers Speed Scrap Handling 77
Compound Is Magnetic When Heated 78
Progress in Steelmaking—X-ray Insures More Uniform Sinter ...80
J&L Redesigns Its Sinter Cooler ...82
Teflon-Insert Die Tames Toughies ..87
Interplant Radio Ups Efficiency ...90
Paper Thin Tubing Cuts Weight ...92

MARKET SECTION:
Market Outlook 107
Complete Index to News and Prices 107
Steel Set for Cryogenics Battle ..109
Wheeling Offers Thin Tin Plate ..111
Price Cut on Type 422 Stainless ..111
District Ingot Indexes and Chart .112
Quality Key to Greater Scrap Use .124
Nonferrous Metals—'61 Stacks Up as Year of Labor Peace 128

DEPARTMENTS & INFORMATION:
Servicenter 5
Editorial and Business Staffs 6
Calendar of Meetings 10
Metalworking Week 17
Metalworking Pulse 20
Men of Industry 59
New Products 95
New Literature 105
Advertising Index 133

©1961, The Penton Publishing Co.
All rights reserved.

Editorial index available semiannually.

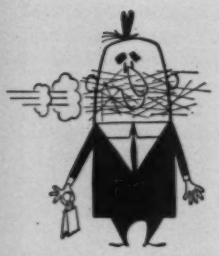
STEEL also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

accused of air pollution. (It says it will have controls installed in a few months.) A spokesman for the House Subcommittee on Health & Safety, chaired by Rep. K. A. Roberts (D., Ala.), told STEEL that Mr. Roberts does not believe in giving the federal government a blank check to investigate air pollution. He prefers local control. But he warned that the problem is so serious that the federal government will have to step in if local officials can't handle it.

How to Plan for Profit Growth

That's the theme of STEEL's 1961 Program for Management, which begins on Page 45 in this issue. The profit squeeze is metalworking's most pressing problem. STEEL's series will air approaches to solving it.

Straws in the Wind



Chase Brass & Copper Co. says its new version of diffusion bonding can join two pieces of copper with a homogeneous bond that is sometimes stronger than the base metal. For details, see STEEL next week . . . Hotpoint Div., General Electric Co., has spent $8 million for design and engineering improvements, new tools, and plant equipment to produce its 1961 appliance line . . . Employer payments for employee security have climbed 179 per cent in the last decade, while total wages and salaries were rising 81 per cent, the National Industrial Conference Board reports . . . Philco International Corp.'s refrigerator exports from the U. S. during 1960 were 53 per cent greater than they were in 1956 and 14 per cent above the 1959 level, while total refrigerator exports dropped 22 per cent below the '56 mark and about 9 per cent below the '59 mark, the firm reports . . . Aluminum usage in mobile homes will increase from 38 million lb in 1960 to 42 million lb in '61, says Kaiser Aluminum & Chemical Corp. . . . The Reading Railroad has cut salaried workers' pay by 10 per cent and laid off about 10 per cent of its unionized employees . . . The value of U. S. mineral output last year was $17.8 billion —up 4 per cent from the 1959 figure and the second highest total on record, the Interior Department reports. Metal output rose 28 per cent above the level in strike-affected 1959 . . . The University of Illinois has established an advanced program in nuclear engineering, leading to a Ph.D. in the field.

Metalworking Pulse

The Business Trend: During the week ended Jan. 7, industrial production was still under the effects of vacation schedules. Steel production was the only component to show any significant advance. **Autos:** With sales slowing down and inventories increasing, production schedules are undergoing almost weekly revisions downward from fourth quarter levels. **Steel:** Ingot output is expected to edge ahead after a 23.4 per cent in the week ended Jan. 7.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended Jan. 7 . . . . 135†
  Year ago 182
  Details on Page 55

- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Jan. 14 . 90,000*
  Year ago 173,713
  Details on Page 52

- **STEEL INGOT OUTPUT (TONS)**
  Week ended Jan. 14 . 1,400,000*
  Week ago 1,361,000
  Details on Page 112

†Preliminary. *Estimated.

It takes real versatility to fill the bill in the experimental heat-treating laboratory at North American Aviation, Inc., Los Angeles. A furnace, for example, must be ready to do most anything, and do it well. This Hevi-Duty furnace does just that.

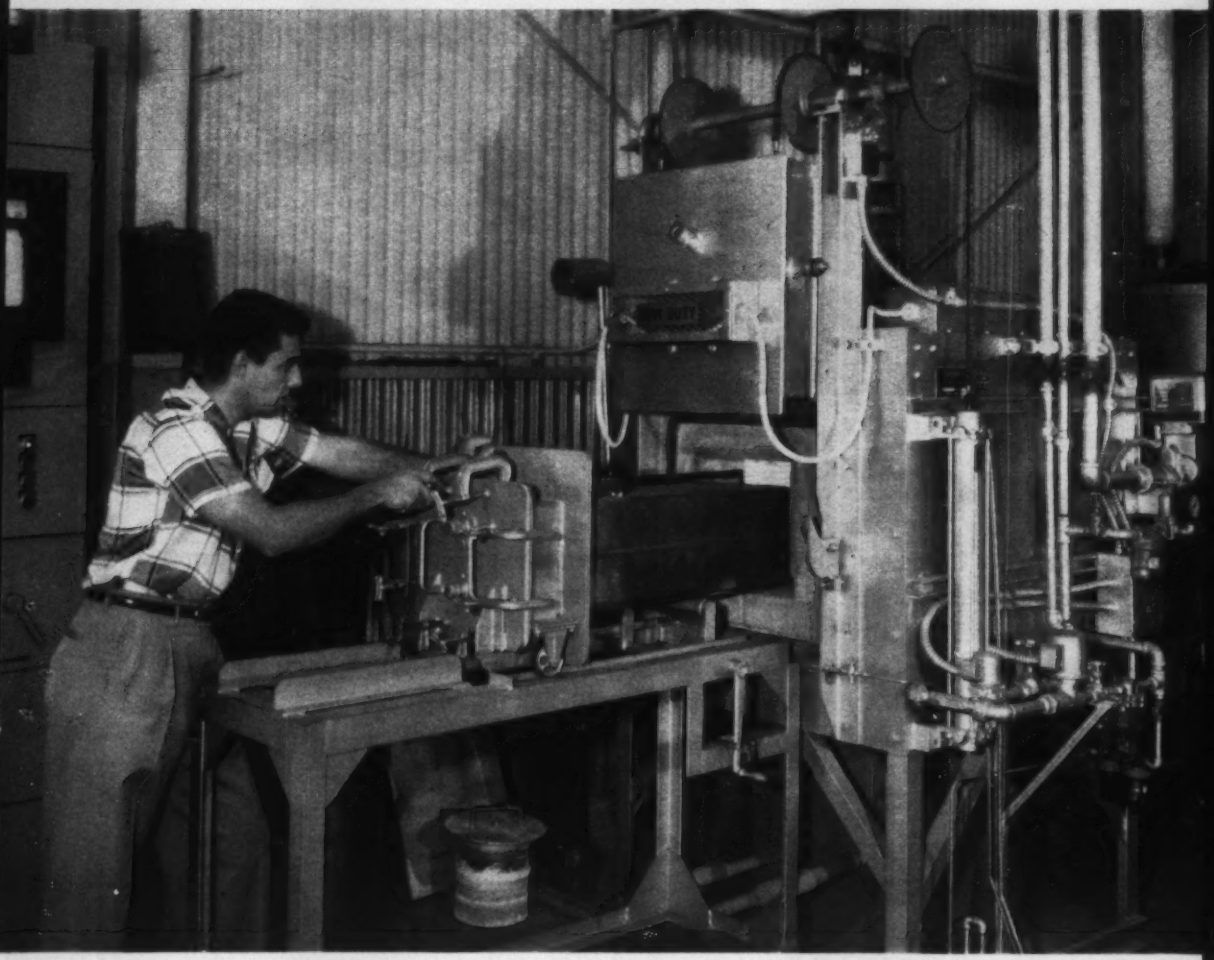
Sometimes it operates at 250° F; sometimes at 2200° F. Yet it holds to ±10° F over the entire range. It has an air-operated door. It also may be used with or without a muffle. A roof plug shuts off door coils when the muffle is used.

There is a retort on a movable stand, complete with trays and a plug-type door. The furnace may be used with or without a fan assembly in the roof. It has a door curtain burner and operates with all types of atmospheres.

It took creative engineering to meet all these requirements. It took *Hevi-Duty* engineering. Why not describe your special requirements to a Hevi-Duty representative? There is one near you.

JACK OF ALL JOBS

...at North American



HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

B P C

A Division of Basic Products Corporation

Hevi-Duty Electric Company, Watertown, Wis.

Hevi-Duty, the Long Line of the Furnace Industry.

NEW FROM FAIR STREET • HOME OF THE JIGMIL

new series

"Designated the model 'H,' our new Jigmil series provides greater range, is more rugged, easier to operate and more accurate."

"Available in spindle sizes ranging from 3" to 5", the new 3H, 4H and 5H machines greatly increase JIGMIL range for precision boring, milling, drilling and other operations. The new series introduces simplified controls, thermal control of main spindle bearings for increased accuracy . . . wider bed and table for added stability and working range . . . stainless steel way covers for positive protection . . . features that reach a new standard in JIGMIL accuracy, ruggedness and simplicity of operation. And like all JIGMILS, the 'H' series is available with the DeVlieg Diatrol direct dial dimensioning system or Tapac* —DeVlieg's own system of automatic tape control."

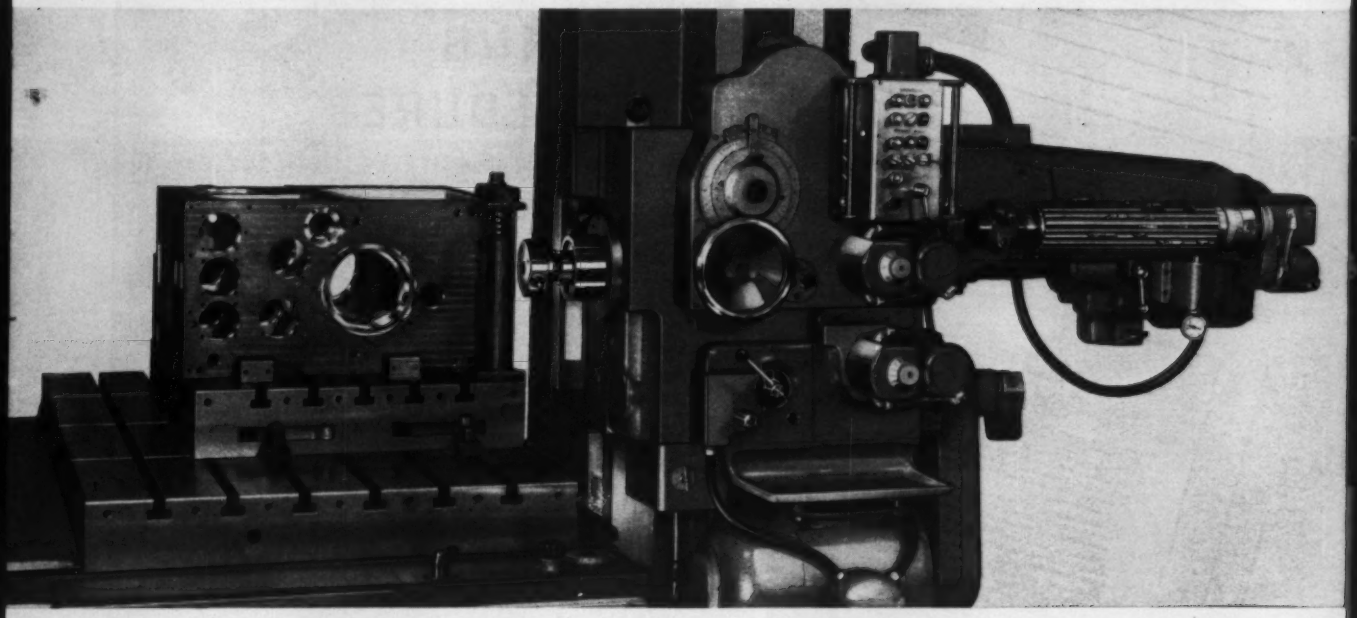
R. A. JERUE
Vice President in Charge of Engineering

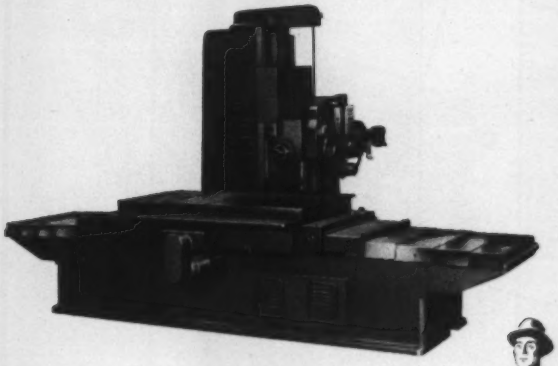
**Tape Automatic Positioning And Control*

DEVLIEG MACHINE COMPANY, FAIR STREET • ROYAL OAK, MICHIGAN

"H" Jigmils®

with Duplitrol • Diatrol • Tapac





Illustrated above is a Precision Spindle Head Casting being machined on a Model 3H-72 Spiramatic JIGMIL. Series 3H machines have 3″ diameter spindle bar, 36″ vertical travel and 48″, 72″ or 96″ horizontal travel, designed for machining all types of production work and one-piece jobs in the medium size range.

Rewarding revelations in automatic precision await your next visit to Fair Street

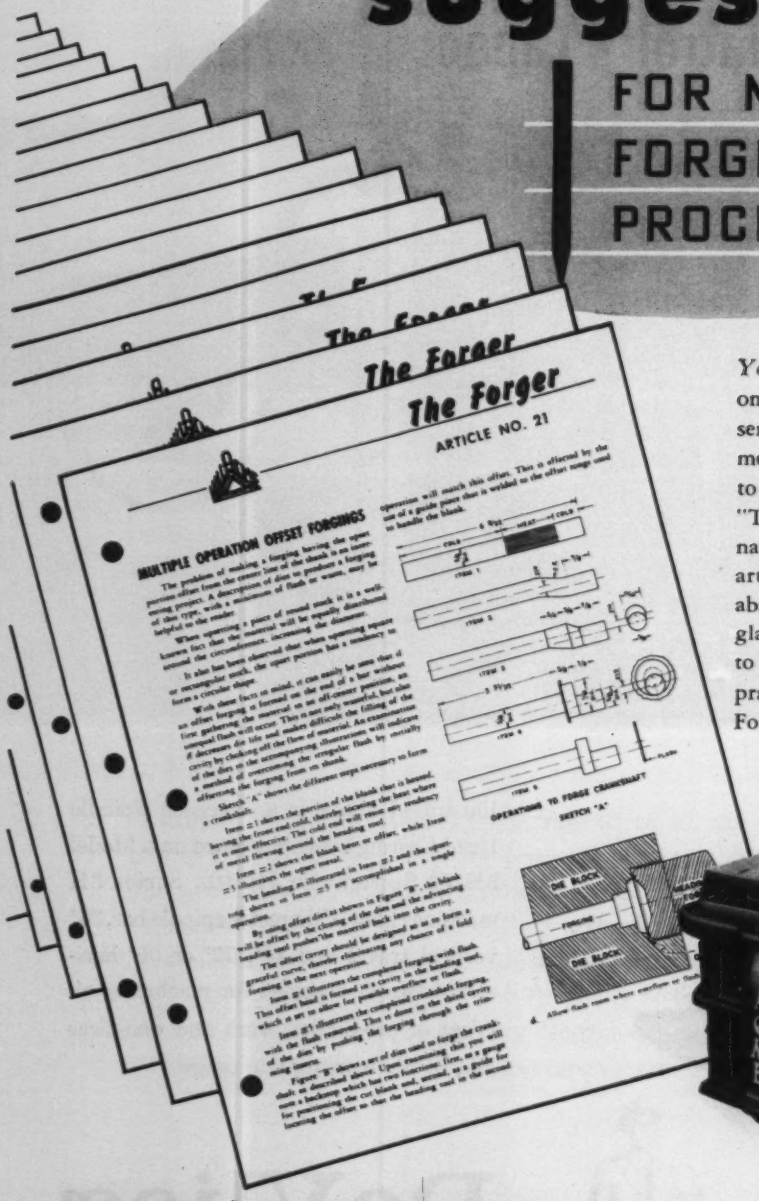
DeVlieg

SPIRAMATIC JIGMILS®

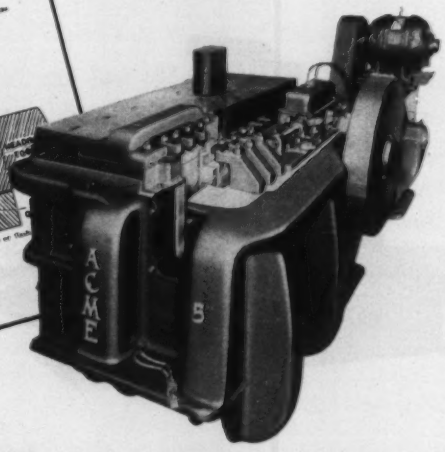
ACCURATE HOLES AND FLAT SURFACES IN PRECISE LOCATIONS

helpful suggestions

FOR MODERN FORGING PROCEDURE



You are invited to have your name placed on our mailing list to receive this valuable series of articles on up-to-date forging methods and procedures. We will be glad to send a complete set of twenty one issues of "The Forger" in addition to placing your name on our mailing list to receive future articles as they are prepared. There is absolutely no charge for this service. We are glad to make this good will contribution to the advancement of modern forging practice as executed on ACME XN Forging Machines.



The HILL ACME Company

1207 W. 65th STREET • CLEVELAND 2, OHIO

"ACME" FORGING • THREADING • TAPPING MACHINES • ALSO MANUFACTURERS OF "HILL" GRINDING & POLISHING MACHINES HYDRAULIC SURFACE GRINDERS • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES

For the ultimate in impact strength . . . this missile launching shoe is FORGED

Low weight, high reliability, shock resistance, great strength, and toughness—this vital part must have all these characteristics, and more. That's why it's drop forged.

Forged steel is a first consideration for high-stress applications. No other process can develop so much useful strength in a piece of steel. But there are other advantages—design freedom, for one. Just look at the complexity of the launching shoe below. Notice the recesses forged right into the product to save weight, reduce machining steps, cut manufacturing costs.

Steel

for Strength . . . Economy . . . Versatility

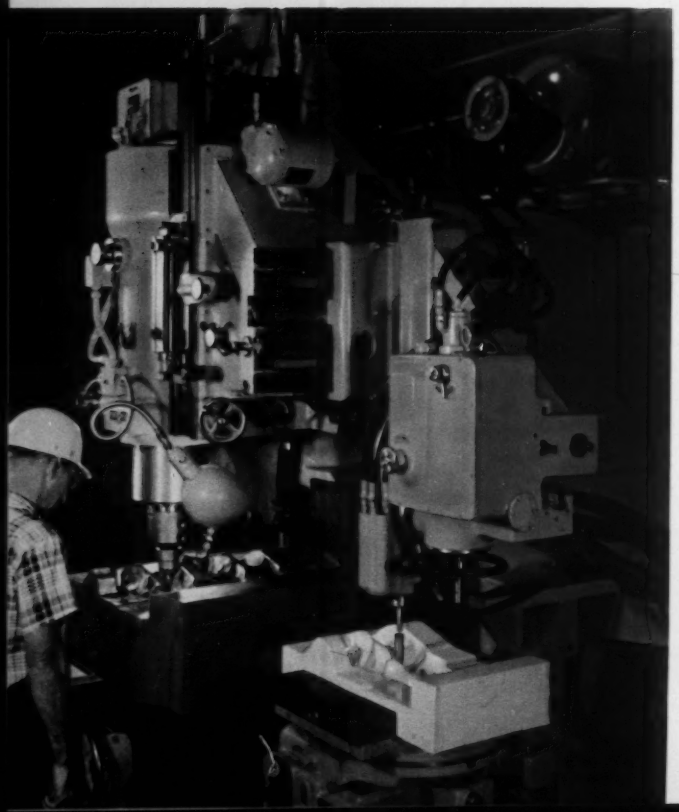
Attached to booster rocket, fore and aft shoes guide missile along overhead rail of launcher.

BETHLEHEM STEEL

Good forgings begin with top-quality steel

High-grade forgings can be made only from top-quality steel . . . such as the carbon and alloy bars, billets, and blooms produced by Bethlehem to high-quality standards. With our close metallurgical control over every step of the manufacturing and rolling processes, Bethlehem produces steels which consistently satisfy our customers' most demanding requirements.

New computer-printer, designed and built by Bethlehem engineers, tabulates and teletypes spectrographic analyses for metallic elements direct to the furnace floor automatically. It now takes but two minutes for the furnace operator to learn the exact chemistry of the steel being made, allowing him unprecedented control over the composition of the steel.



Forging design— key to low-cost, long-service parts

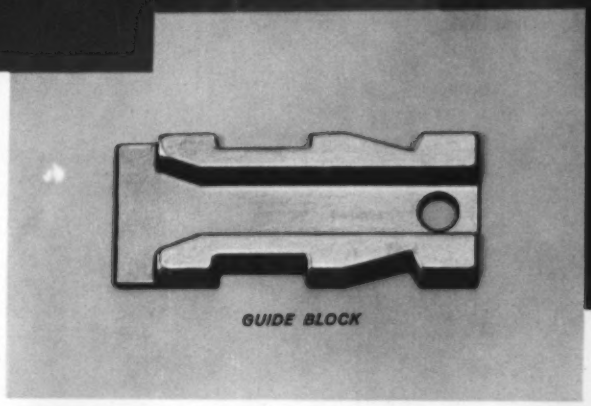
With the modern techniques and modern steels available to the forgings engineer, he is able to translate almost any parts problem into a practical forging design. And with the forge shops' modern equipment, forgers can quickly turn the design into an accurate steel forging.

Properly designed, forgings can meet *your* parts requirements of low weight and high strength, low cost and long life, fast production and top performance. A forgings engineer will be glad to show you how—his services are available through your forgings supplier.

Automatic die-sinking machine accurately duplicates the die shape in an alloy-steel die block by tracing a full-scale model of the forging die. Lower-cost, more-precise dies are the result. And for added savings, replacement dies can be produced with identical accuracy when the forging run exceeds the die life.

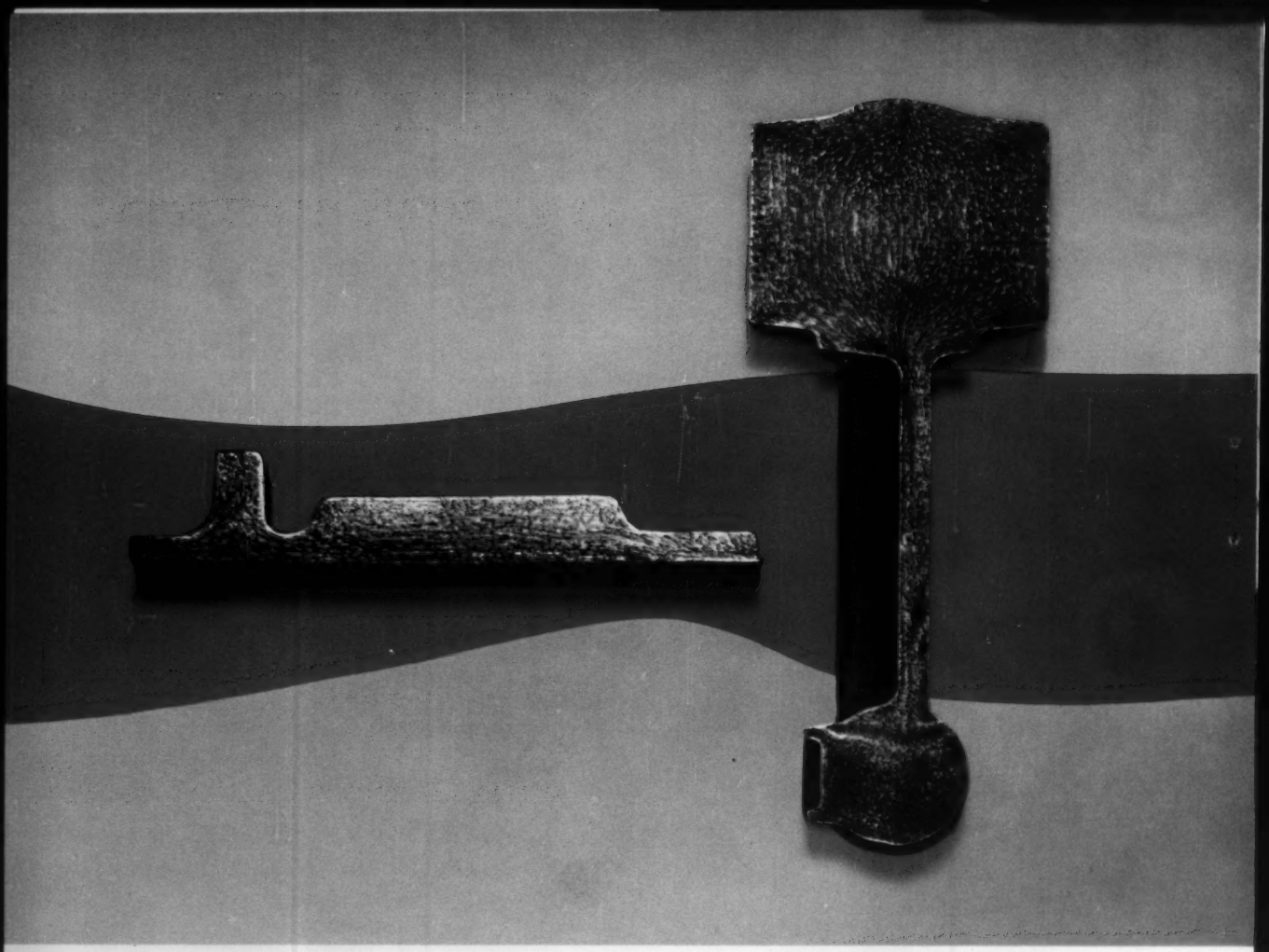
Forgings are so often the best answer:

low cost per unit
reduction of machining time
elimination of fabricating operations
improved design
increased strength/weight ratio
long service life



BETHLEHEM STEEL

BETHLEHEM STEEL



Flowlines tell the story

When quality steel forgings are cut in half, polished, etched, and dyed, one major reason for their great strength and toughness stands out clearly. These are the flow lines, evidence of the directional flow of the steel as it has been worked within the closed-die cavity. This pattern determines the areas of maximum strength in the forging, and is controlled primarily by the shape of the die.

Your forgings supplier knows how to work steel to give the forging its greatest strength where most needed. *But the quality of the steel is a forging's most important ingredient.* This is why so many forgers come to Bethlehem for their steel requirements—carbon and alloy steels which must meet the varied but exacting specifications required by the many types of forging processes. They've found they can depend on the quality of Bethlehem steels. You'll find you can, too.

Bethlehem Steel Company
Publications Department
Bethlehem, Pa.

Please send me the booklets I have checked:

- ☐ **366, Guide for Selection of Carbon Steel Bars**
- ☐ **415-D, Quick Facts about Alloy Steels, Fifth Edition**
- ☐ **420-B, Steel Analyses . . . a pocket-size listing of carbon, alloy, and tool steels.**

*Name*_____

*Company*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

Send coupon for more information on our forging steels

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

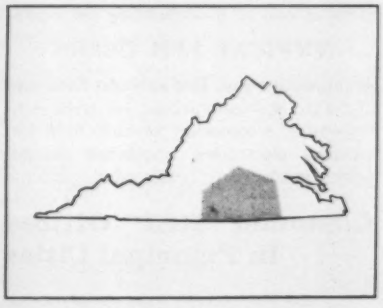
BETHLEHEM STEEL

Single-Place Gyrocopter by Bensen Aircraft Corp.

Looking for production savings?

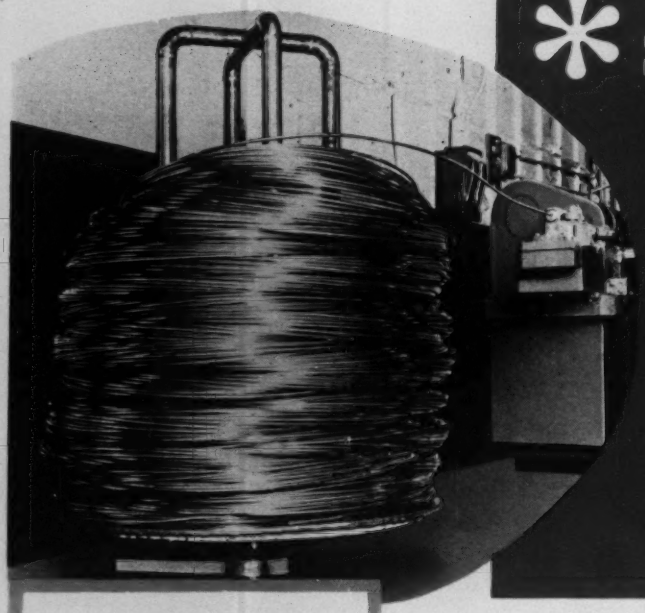
Look into Southside Virginia

Production savings start with people. Today 20% of the manpower and 80% of the woman power of Southside Virginia are ready to staff your plant. You're on the world's main line for top grade coal. And this area's well-managed forests have hard and soft woods in abundance. Ask VEPCO for site and economic data on Southside Virginia's pleasant, hospitable, conservatively governed communities. Write, wire or phone in complete confidence.



VEPCO VIRGINIA ELECTRIC and POWER COMPANY

Clark P. Spellman, Manager—Area Development, Electric Building, Richmond 9, Virginia • MIlton 9-1411
Serving the Top-of-the-South with 2,086,000 kilowatts—due to reach 2,720,000 kilowatts by 1963.



* See how much you can SAVE in time, labor, scrap and handling...with DSC-PORTSMOUTH LPR COILS

DSC-PORTSMOUTH LPR® CONTINUOUS LENGTH BRIGHT WIRE COILS

LOW AND MEDIUM CARBON
.072″/.500″ inc. (to about 4200 lbs.)
.023″/.071″ inc. (to about 1000 lbs.)

HIGH CARBON
.072″/.250″ inc. (up to about 4200 lbs.)
.023″/.071″ inc. (up to about 1000 lbs.)

COIL DIMENSIONS ON REQUEST

LPR GLOSSARY

high-den·si·ty *adj.* Greater weight per cubic foot.

self-sup·port·ing *adj.* These coils are packaged so they don't require carriers of any kind (returnable or otherwise) in transit or stock.

long pro·duc·tion run *adj.* LPR's are available in weights from 1,000 lbs. up to about 4,200 lbs. to give you up to 40 miles of non stop fabricating per setup.

TYPICAL LPR USERS

Manufacturers of: Bed springs; furniture and auto cushion springs; concrete reinforcement accessories; juvenile vehicles; welding electrodes; appliance components; wire baskets; cold headed products.

Customer "REP" Offices in Principal Cities

COPYRIGHT DETROIT STEEL CORPORATION 1961

Here are digests of the kind of reports we receive from Brite Wire Fabricators who switch from conventional mill bundles (150 to 400 lbs.) to high-density, self-supporting, Long Production Run LPR's.

* Downtime frequency due to coil changes and set-up adjustments reduced as much as 95%
* Unloading time alone cut as much as 82%
* Productivity increased from 20% to 33⅓%
* Scrap loss slashed in direct ratio to coil changes avoided
* Man-hour costs trimmed 20% and more
* High-density, self-supporting coils reduced storage space by 20% to 50%
* Inventory management greatly improved
* Returnable-carrier problem and small coil racks eliminated

These *extra benefits* are yours *without extra cost* . . .

Learn what LPR can do for your Brite Wire operations. Would you like one of our novel Downtime Slide Charts? Your DSC customer "rep" will give you facts promptly, or write Detroit Steel Corporation, P.O. Box 7508, Detroit 9, Michigan.

Customer Satisfaction—Our No. 1 Job

Performance Proved DSC Steel

DETROIT STEEL

Flat Rolled and Wire Products

Let's Back Kennedy!

Many people are expressing apprehension over the way policies of the new administration may affect them or their businesses.

We do not think the fears are justified.

Mr. Kennedy won by an infinitesimally small margin. He has no mandate from the people to explore radically new social frontiers. We don't think he would have anyway.

Mr. Kennedy is smart, knowledgeable, and ruthless.

He has enlisted the aid of experts to help him with his executive duties.

Despite some of his offbeat statements during the heat of the campaign, he understands troublesome economic problems at home and political problems abroad.

At home, we think he will deal constructively with problems in industry.

We also think he will deal objectively with such labor problems as featherbedding, despite pressure from the unions that spent millions getting him elected.

Abroad, we think he will deal forcefully with the problems of the cold war, foreign aid, and our shrinking gold reserves.

Germany, for one, will assume some of the burden of aid to underdeveloped countries to help relieve the drain on U. S. gold.

Tougher problems have been faced by few administrations.

In coping with them, Mr. Kennedy and his aides will make mistakes and do many things right.

We think that the new administration should be criticized when criticism is merited.

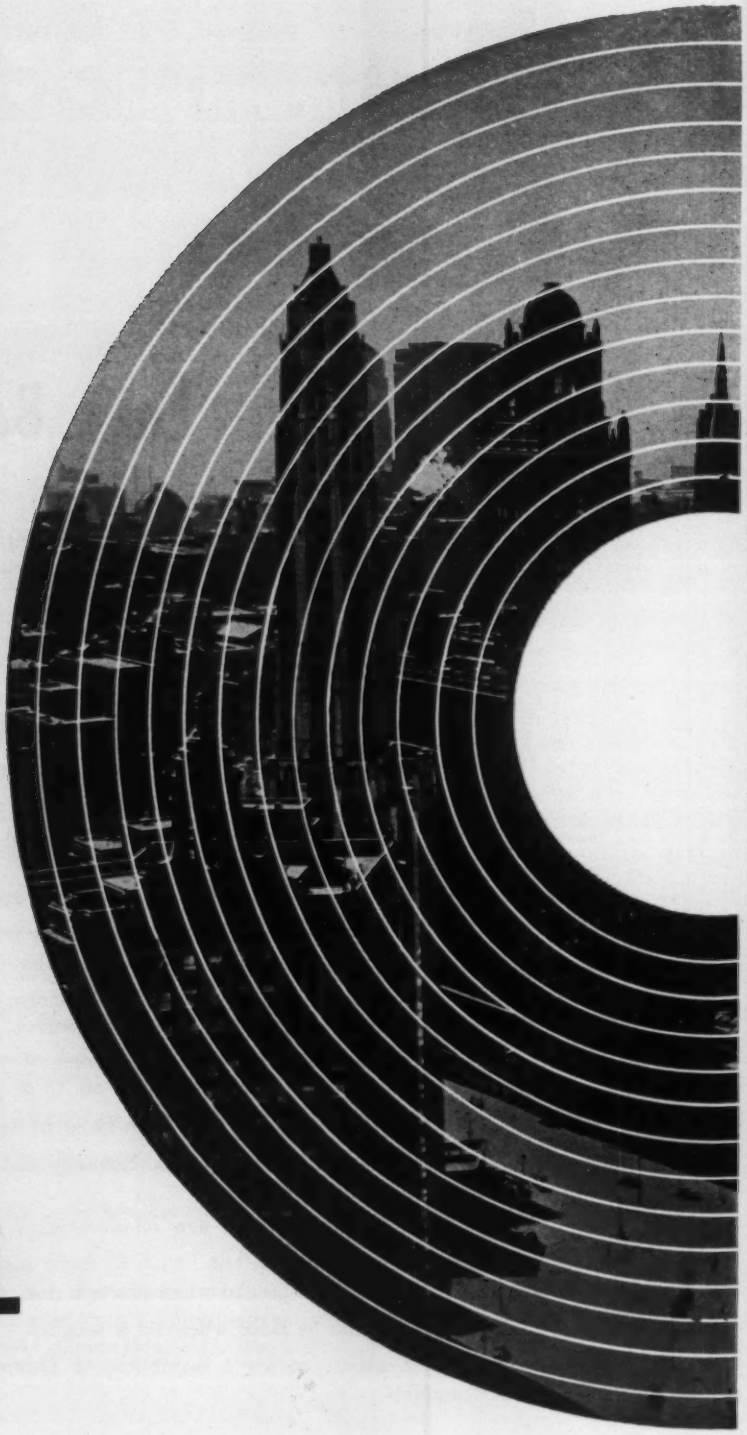
It should be praised when praise is due.

It should be aided when aid is sought.

Whether you are a Republican or Democrat, Mr. Kennedy merits your full support.

Irwin H. Such

EDITOR-IN-CHIEF



NOW
MORE
GALVANIZED
STEEL
FOR
MID-AMERICA
FROM
NEW

MIDWEST STEEL

For one of the greatest steel-consuming areas of the country, galvanized steel will now be in greater supply. The source is close, the service is fast, and the quality is second to none. Because

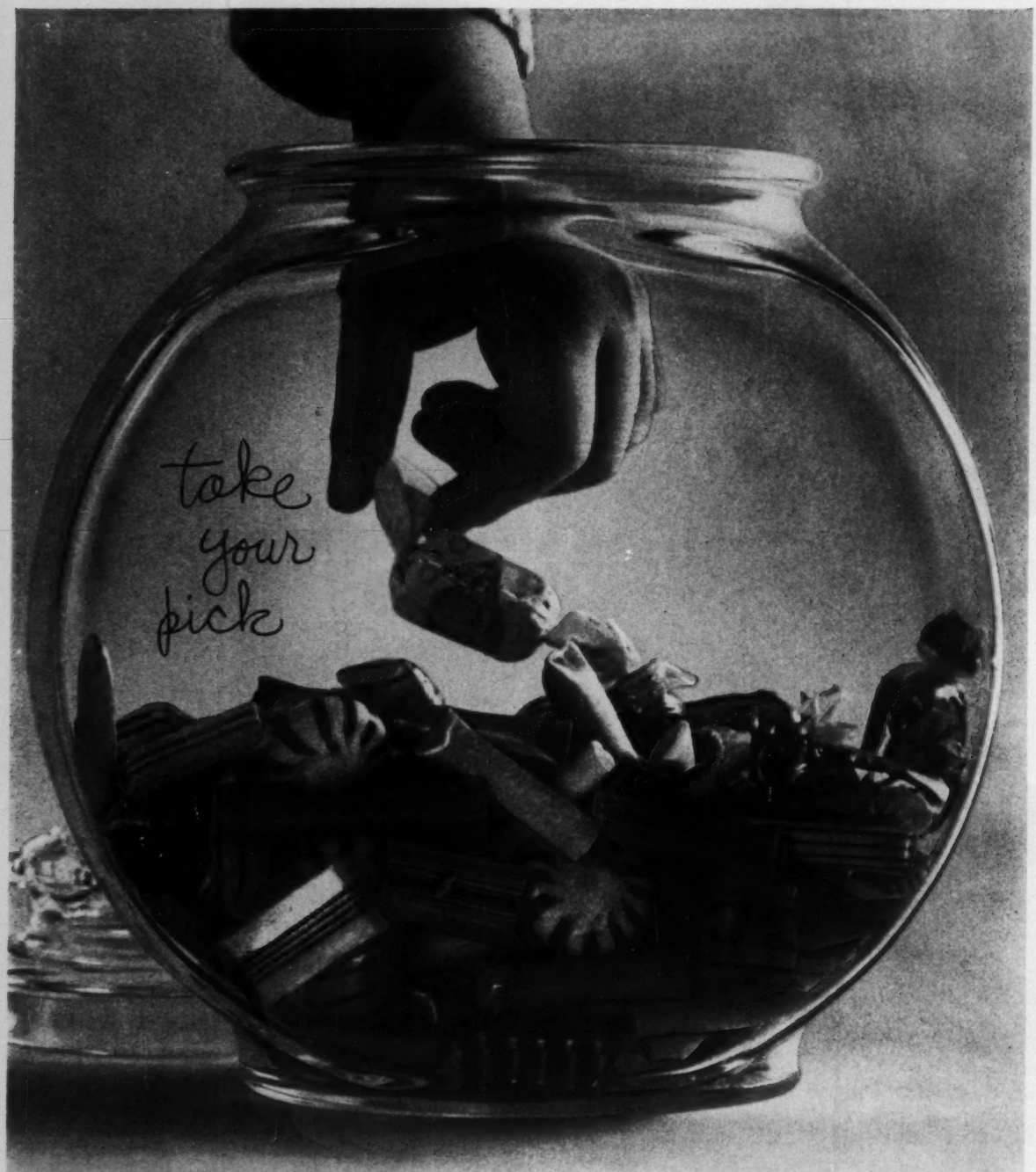
MIDWEST STEEL | **WEIRTON STEEL**

Portage, Indiana | *Weirton, West Virginia*

divisions of

NATIONAL STEEL CORPORATION

Weirkote, the modern continuous-process galvanized steel, is now being produced at our new Midwest Steel facilities in the Chicago area, as well as at our Weirton Steel division in the Pittsburgh area.



. . . select the type and size of steel you require . . . any amount, in any variety . . . and your ***Steel Service Center*** can provide it, one—two—three! ■ A phone call is all it takes to get Steel Products Delivery . . . fast . . . and dependably! ■ For example, your nearby ***Steel Service Center*** is ready to take care of your needs for such Inland Steel products as Ti-Co® galvanized sheets or coils, Ledloy® leaded steels, 4-Way® Safety Plate, bars, flat-rolled and structural steels. ■ Wide selection and speedy delivery are but two of the many advantages offered by your ***Steel Service Center.*** It will pay you to get *all* the facts. Why not call today.

STEEL SERVICE CENTER INSTITUTE

INLAND STEEL COMPANY
30 West Monroe Street
Chicago 3, Illinois

Industry told the Treasury Department . . .

Present depreciation allowances are unsatisfactory, said 63% of the large companies and 42% of the small ones

Their preferences for liberalization:

1. **Freedom to select the useful life of equipment and method of depreciation.**
2. **Depreciation adjustments that reflect price levels.**
3. **Grouping of assets into broad class categories, with shorter minimum lives prescribed by law.**

What's Ahead for Depreciation?

LOOK FOR the House Ways & Means Committee to consider depreciation reform by about June.

Despite the Jan. 5 release of preliminary results in the Treasury Department's survey on depreciation practices and needs in industry, the tax writing group will probably be engaged for about five months on other matters.

During his campaign, President-elect Kennedy guardedly admitted the need for depreciation change, but he gives higher priority to social security and other tax reform. Watch Ways & Means deal first with what he thinks is most urgent.

• **Bypass?**—One indication of the approach Mr. Kennedy may favor is contained in a secret tax analysis prepared for him by Prof. Stanley Surrey of Harvard.

The report contains the recommendation that business be granted a special deduction from its final income tax bill if its investment in new plant and equipment is more during the year than its depreciation deduction. Apparently it would be a short term approach.

• **Business Stimulant**—Observers believe that the only way to get the issue of full reform advanced on the Congressional agenda is to sell the new President and Congress on its potential as a long term business stimulant. Fast writeoffs had such results during World War II and the Korean War. Liberal depreciation policies have spurred business abroad.

A decisive majority of the 3500 firms responding to the Treasury survey (65 per cent of the 2000 large and 59 per cent of the 1500 small businesses) indicated that liberalized depreciation would allow them to increase their capital expenditures.

• **Cold Comfort**—While the returns are encouraging, Treasury survey results underscore three problems which have hampered thorough reform for years:

1. A distressingly large number of firms still don't recognize that they have a problem. About 32 per cent

Togetherness on Needed Legislation?

THE STEEL industry's Human Relations Research Committee, representing both management and labor, may have reached common ground upon which it can demonstrate just how much togetherness it can muster.

The group, with David McDonald, United Steelworkers president, and R. Conrad Cooper, U. S. Steel Corp.'s chief negotiator, as co-chairmen, meeting in Washington on possible approaches to the economic plight of the industry and its workers, may provide the common ground needed.

The group exchanged views and agreed to conduct further meetings on the problems.

Pointed out Mr. McDonald: An estimated 150,000 of the 530,000 steel workers are unemployed. He favors more public works spending and higher federal wage minimums.

Said Mr. Cooper: An estimated $96 billion is needed to replace obsolete equipment in all of U. S. industry. He favors a more realistic approach to depreciation to solve the steel industry's long range problems and benefit in the short term steel consumers like construction and machine tool industries.

Steelworkers' McDonald, U. S. Steel's Cooper

Admittedly, no new proposals were voiced. But outsiders looking in wondered about this possibility: Can the committee come up with a joint legislative proposal to Congress for action on depreciation and a program to stimulate the economy?

---

of the large corporations and 53 per cent of the smaller firms regard present allowances as "reasonably satisfactory." About 5 per cent in each category had no opinion.

2. Industry is unrealistic and divided on the reform it wants (see Page 35). A majority of both large and small firms prefer complete freedom in picking their writeoff methods. "It would have been better to comment on more specific methods of reform," says an expert from Machinery & Allied Products Institute. "The freewheeling method doesn't stand a chance of getting through the Treasury or Congress."

3. Industry has not taken full advantage of the partial reforms already on the books. Some 30 per cent of large corporations and 43 per cent of small firms don't use liberalized writeoff methods approved in 1954. (The large corporation figure is misleading, however, because it includes public utilities whose special situation makes the new depreciation methods unattractive.) Only 22 per cent of the larger corporations and 37 per cent of the smaller elected to use the additional first year depreciation allowance enacted in 1958. MAPI points out that this result makes congressmen ask: "Why should we give them more when they all haven't even used what we have already granted?"

• **On the Other Hand**—Although many companies say they have no depreciation problem, the number of firms citing reasons for the inadequacy of present allowances was greater than those that disclaimed any difficulty.

The respondents named three major causes of depreciation trouble:

1. Changing price levels.
2. Excessively long useful lives permitted for tax purposes.
3. Inappropriate timing of allowances resulting in an insufficient allowance during the early years of service.

• **Uphill Battle**—The fight for depreciation reform won't be won easily in 1961. The Treasury study is a matter of information, not a working type report which a Congressional committee could take action on. The final report, with the complete statistical breakdown, will not be ready until March at the earliest. That means it will be handed to Congress by the Kennedy administration, with its recommendations.

The recommendations might be more favorable if labor supported reform. An AFL-CIO report last year on taxation opposed it. However, United Steelworker President David J. McDonald hints that he could favor change (see above).

• **Cautious Congress**—STEEL's interviews of Ways & Means Committee members indicate they wish to avoid a fight on the matter, which many feel will occur if the issue gets wide attention.

Several bills on depreciation went into the hopper in the opening days of Congress (Page 42), but the number is not unusual.

Former AFL-CIO Official Assesses Labor Outlook

Prof. Jack Barbash, labor economist, University of Wisconsin

- **Automation will encourage whitecollar unionization.**
- **Unions will seek more strength in political arena.**
- **Pressure will grow for more "public policy" at the bargaining table.**

INCREASINGLY, the whitecollar worker is a statistic, a payroll item, says Prof. Jack Barbash, labor economist, University of Wisconsin, and a former research director for the AFL-CIO Industrial Union Department.

"The whitecollarite is . . . part of a large group of people, all doing the same work, several times removed from the sources of authority and power in the management of enterprise . . . The dream that he, too, can become a boss is steadily evaporating," Professor Barbash contends in a paper now being published by the University of Michigan Bureau of Industrial Relations.

"When the whitecollar person becomes a baby sitter for an automated machine, pride of work gets drained out of his job, and he is going to try to join with his fellows," the professor adds.

He forecasts that while unions now are "much too tarnished with the image of Hoffa" to score major gains among office and professional workers, over a longer period these groups will join unions "in droves."

• **White Remains White** — Structurally, whitecollar unions, even those that are part of established industrial unions, retain identification as whitecollar groups. Functionally, that is shown in collective bargaining by way of merit rating provisions, underplaying of seniority features, and emphasis on special layoff and recall rating systems, notes Professor Barbash.

But, "once the whitecollar wearer gets over the initial trauma of being in a union, he behaves like a bricklayer. Witness the Air Line Pilots Association—a classic example because pilots are the highest paid.

"They are engaging in jurisdictional disputes with flight engineers —an old weapon in Detroit and other places. They are calling quickie strikes and wholesale strikes. In short, they are behaving like trade unionists," he continues.

• **Bluecollar Problems**—There is a general feeling of unrest and disquiet among bluecollar workers, claims the labor economist.

The big problem under automation is immobility, both occupational and geographical, he continues. The dimensions of the challenge go beyond collective bargaining. There is fear that collective bargaining will not be adequate to deal with the disorganizing effects of automation and that public policy will have to intervene.

• **The Political Arena**—Faced with a more conservative Congress, unions will pay more attention to educating members as to the meaning of legislative and political issues—making up in intense application what they may lack in overall influence, he says.

Historically, notes Professor Barbash, unions have tried to offset weakness at the bargaining table with strength in the political arena. He predicts that "public policy will be increasingly concerned with the consequences of large scale industrial disputes . . . the shattering effects of large strikes in big industries are making some labor people take a more rosy view of government intervention as an alternative to strikes."

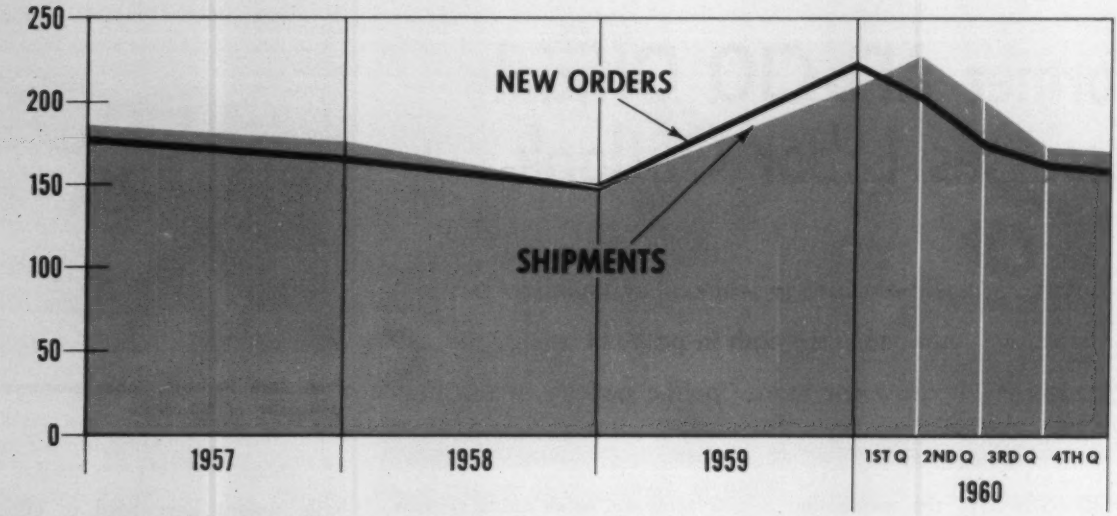
• **Class Struggle**—Industrial relations, like the cold war, has become a battle of containment, the professor suggests. The seeds were germinated in the Taft-Hartley Act of 1947 and nurtured with passage of the Landrum-Griffin Act.

In its desire to "put labor in its place," management has frequently cast its argument in terms of a "class struggle." The Wisconsin expert says that this overlooks the economic base of management's bargaining power and poses a serious threat to the future of industrial relations. "When the unions had the economic advantage, they pressed it hard. Now it is the employers' turn," he comments.

Profits are down; competition is keener; the virtually guaranteed consumer market for durable goods has disappeared; and breakeven points in steel and other industries are low. Those factors, among others, suggest that management should stress economics, not ideology, in its bargaining, concludes Professor Barbash.

Shipment & New Order Index for Screw Machine Products

(1946-49 = 100)



Fourth quarter, 1960, estimate by STEEL.
Source: National Screw Machine Products Association.

Screw Machine Product Backlogs Down

MAKERS of screw machine products look for an upturn in the first quarter, but the improvement will still leave the industry 10 to 20 per cent below year-ago levels.

The shipments index of the National Screw Machine Products Association should hit 185 (1946-49 = 100), predict association executives, vs. 227 in the year-ago quarter (see chart).

For 1961 as a whole, industry executives evinced little optimism in replies to a STEEL questionnaire. Sales in the first 11 months of 1960 were about 7 per cent below those of the like 1959 period. Typical comment: "We'll do well to hold our own in 1961."

• **Slow Start**—The industry's backlog at the end of November (about six weeks) was down 28 per cent from where it was at the beginning of 1960. More than 80 per cent of the firms contacted by STEEL feel that profits will be lower than last year's. Reasons: Fierce competition, price fighting, and reduced volume. All companies are stressing cost cutting programs to lower breakeven points.

Though the industry—like many others—has had some wage increases, there's little hope of boosting prices.

• **Capital Spending Down**—Expenditures for replacement and modernization programs by the industry are being pared because of the business outlook. Only one respondent reported substantial outlays for the coming year. Most companies complain that they have too much capacity now.

In addition to price fighting (most of the larger firms blame "alley shops" for the practice), customer delivery demands are causing headaches. "They want yesterday delivery on most items, and the repeat order customers expect us to carry their inventories — boosting our costs all around," lamented a Chicago executive vice president.

• **Foreign Competition** — Imports aren't hurting most shops. However, one or two East Coast firms report that some customers have given long leadtime orders to overseas competitors. "Most of our foreign competition comes from business lost when domestic firms buy components and products overseas. If they were bought in this country, we'd at least have a bidding chance at the screw machine made parts going into them."

Strikes Hit Postwar Low

About 3300 work stoppages began in 1960, the lowest level since 1942, reports the Labor Department. The stoppages involved 1.4 million workers, matching the postwar level reached in 1957. An estimated 20 million mandays of idleness occurred, accounting for 0.2 per cent of the estimated working time of all workers in nonfarm establishments (excluding government). While the figure for mandays lost last year was 20 per cent higher than it was in 1957 (due to an increase in the duration of stoppages), it was below that of any other postwar year.

Price Confusion Hits Zinc Market

Producers and consumers unhappy over situation; both reticent on predicting outcome

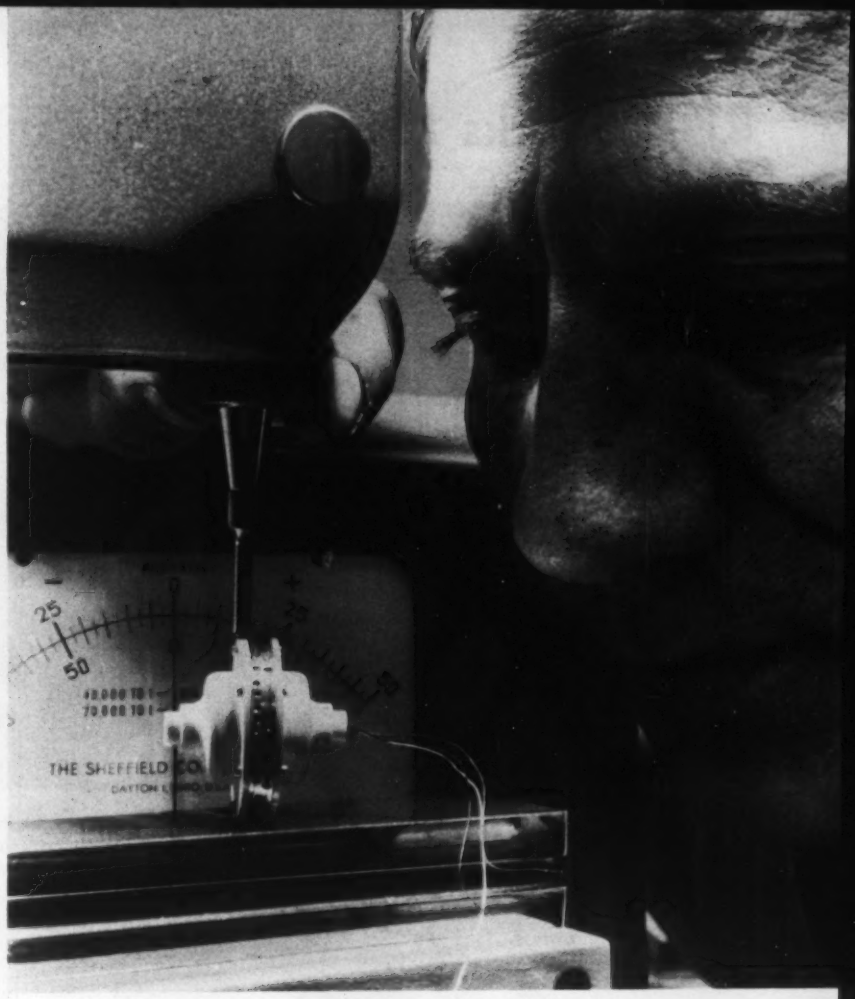
THE ZINC market is bothered and bewildered by probably the most confusing price situation in the industry's history.

• **Background**—As the market failed to pick up in the fourth quarter, discounting became intense (via such things as absorption of freight, "easy" granting of quantity prices, and unofficial cutting of premium grades). Finally, contracts were reportedly being offered that guaranteed shipment of metal at ¼ to ½ cent a pound under the quoted price, no matter what it might be.

St. Joseph Lead Co. stepped in and announced that because of the discounts being granted, it would price its zinc at ½ cent a pound under the quoted *E&MJ* average (see STEEL, Jan. 9, p. 110) until the pricing situation cleared up. It meant that the selling price of zinc could be no higher than 11.5 cents a pound, ½ cent under the "official" quotation of 12 cents. However, because of the confused market, *E&MJ* had to quote a "nominal" price, so, in effect, a discount was being offered on a nonexistent price.

• **Quoted Price Down**—Last week, most producers officially lowered the zinc price ½ cent to 11.5 cents a pound and dropped the diecast alloys by ¾ cent a pound. Some didn't quote a price at all. St. Joe said its discount policy "applied only to currently booked January shipment, and a decision to discontinue this emergency measure will be announced as soon as other domestic producers give tangible evidence of adopting market practices under which all consumers would be able to purchase zinc on a published price structure."

That was the situation as STEEL went to press. One veteran zinc man said it is the most confusing market in memory. Consumers are unhappy. Producers are unhappy. At midweek no one knew what the selling price of zinc would be a few days hence.



Ceramic parts in the gas bearing of this Minneapolis-Honeywell gyroscope are machined to tolerances within 5 millionths of an inch

Electrical Industry Paces Metalworking R&D Spending

METALWORKERS can expect big things from the electrical industry in the coming years, thanks to vigorous research and development programs. Already devoting a larger percentage of their sales dollars to R&D than any other industry, firms in Standard Industrial Classification 36 (electrical machinery and equipment) tell STEEL they'll boost R&D outlays 3.2 per cent this year over 1960's. That's well above metalworking's average.

The National Science Foundation, Washington, says electrical manufacturers poured out $1.8 billion in 1957, $1.9 billion in 1958, and $2.3 billion in 1959 for research and development. Expenditures last year were estimated by industry sources at $2.4 billion. And a continued increase in the dollar volume of spending is seen for the next five years.

• **Goals**—Here are some of the improvements metalworkers can expect:

- New concepts in electric power generation.
- Increased efficiency, automation.
- More compact units, miniaturization.
- Broader choice of equipment for

R&D Sparks Metalworking Automation

General Electric's new Mark Century control, using static solid state devices, cuts lathe contouring costs

Operations at Republic Steel's 11 in. bar mill, South Chicago, Ill., are regulated from control pulpit

meeting specific customer needs.

• **Why Such Spending?**—"Electricity controls almost everything. We must keep ahead of technological advancements in other industries as well as our own," asserts E. R. Jung, vice president - marketing, Clark Controller Co., Cleveland.

"The electrical industry, developing rapidly, is intensely competitive," observes Finn J. Larsen, vice president, Minneapolis - Honeywell Regulator Co., Minneapolis. "The R&D content is usually related to the complexity of the device. Other segments of metalworking are older and well established and often deal only with the continuous production of tons of materials."

"The trend to automation is the motivating factor," states Reliance Electric & Engineering Co., Cleveland.

"Today's complex electronic systems require a great amount of research and development," relates Dr. John A. Hutcheson, vice president - engineering, Westinghouse Electric Corp., Pittsburgh. "What's more, we have a tremendous diversity of products to be researched to stay competitive." (Westinghouse has 300,000 variations of 8000 products.)

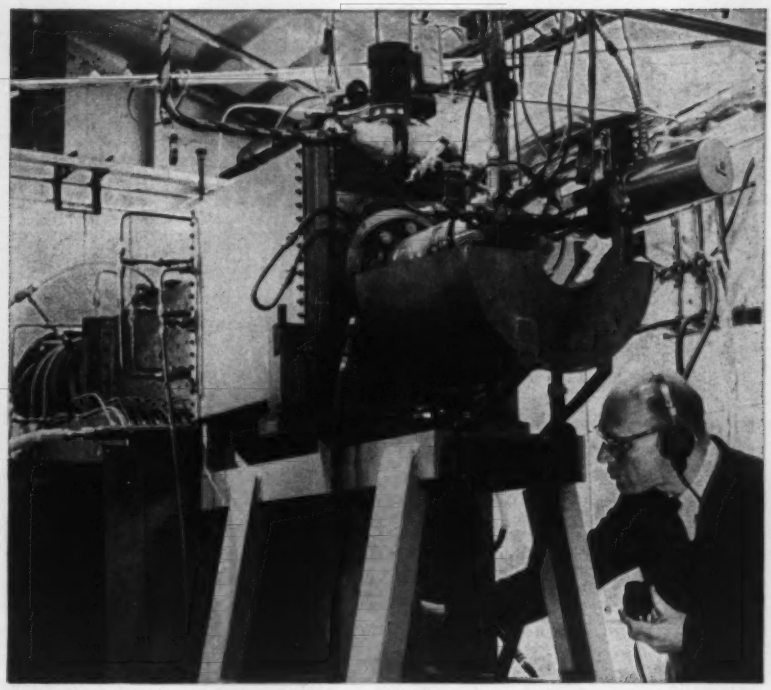
Stiff foreign, as well as domestic, competition adds impetus to R&D programs in the industry, comments John R. Eastman, vice president-engineering, Sterling Electric Motors Inc., Los Angeles.

• **What's the Result?**—The programs are paying off in many ways. For example, four areas of direct conversion of heat to electricity are under scrutiny:

• Thermoelectricity. Electrical current is generated by applying heat to a thermocouple (two parallel bars of dissimilar materials joined at the ends). Less than four years ago, Westinghouse was attempting to produce enough such current to light a flashlight bulb; last year, the company built a 5000 watt thermoelectric power generator. By 1970 or thereabouts, says Mark W. Cresap Jr., Westinghouse president, "we expect to have the knowhow to build a generator up to 100 megawatts in size which can be bought for $80 a kilowatt. Nuclear fired, it would have an over-all efficiency of 20 per cent." Researchers see a potential of up to 30 per cent efficiency for such units, which have no moving parts, allowing maintenancefree, noiseless operation.

• Magnetohydrodynamics. Electrical current is generated by a gas or liquid passing through a magnetic field. But the lowest possible temperature at which generation can take place is 3500° F. New materials must be developed or ways of making known materials work must be devised which can maintain their structural strength under such conditions. They must also be able to contain a gas passing through them at wind tunnel speeds of about 3000 mph. Perhaps 10 or 20 years from now, projects Mr. Cresap, an MHD generator with hundreds of megawatts capacity—complete and fully proven—will be available.

• Thermionics. Heated electrons are used to provide electric power. Mr. Cresap sees this method best



Westinghouse says this experimental magnetohydrodynamic power generator is the first to operate in the kilowatt range for a sustained period (4 minutes)

applied in commercial power generation as a topping unit for a nuclear steam plant. It could take advantage of the high temperatures required for operation.

• Fuel Cells. A fuel cell is basically an electric battery which uses relatively inexpensive fuels fed continuously into the system. Development of this power source has been given priority because of projected military applications. Mr. Cresap views small scale, special purpose uses within five years. Fuel cells have no moving parts and theoretically are 70 per cent efficient.

All of those systems promise higher efficiencies, eventually, than available in present turbine generator systems. They also have the potential for lower capital cost per kilowatt installed. Each has characteristics which might fit particular power system needs or which might give rise to entirely new concepts of power system operation.

• **Miniaturization**—Molecular electronics—the molecular engineering of solid state circuitry where everything is achieved by molecular rearrangement—permits the elimination of such components as diodes, resistors, capacitors, tubes, and transistors in many applications. Result: Reduction in size to as little as one-thousandth of present miniaturization systems and significant gains in the ratio of energy input to output.

Dr. A. M. Holladay, president, International Electronic Industries Div., Standard Pressed Steel Co., Philadelphia, says it is now possible to make a radio (less speaker) the size of a match head. He adds: "Two years ago, 10,000 miniature parts fitted in a cubic foot of space; today, we are thinking in terms of 34 million."

• **Automation**—Mr. Larsen reports his company's efforts in digital techniques and digital computers will increase. "Adaptive controls will be another significant development," he continues. "These systems are capable of optimizing their own performance by sensing their own response and comparing it with an ideal standard. In brief, the machines are intelligent enough to teach themselves the best means of controlling a process or machines."

Tape control of machine tools is becoming increasingly common. For example, General Electric Co.'s Specialty Control Dept., Waynesboro, Va., a leader in the field, reports orders booked for numerical tape control equipment were 420 per cent higher in '60 than in '58.

• **Other Advances**—Upon the development of effective heat pumps, devices which transfer heat from one place to another, some sources believe all heat control systems of the future will operate on electric power.

Better transformer quality through improvement of grain orientation (by controlling the size and alignment of the grains) in silicon transformer steels is a goal of Allis-Chalmers Mfg. Co., Milwaukee.

Ultrasonic welding has permitted the joining of exceptionally thin metals previously thought unweldable or impractical.

Sylvania Electric Products Inc., New York, a subsidiary of General Telephone & Electronics Corp., has developed an electroluminescent switch gear that will glow for five years for less than 5 cents annually and an electroluminescent panel that is almost unextinguishable from impact.

Telemetering devices, which transmit information or data for control from one point to another, have been perfected. Examples: Use in inspection control and for transmitting photos from satellites to earth.

Further areas of study include extrahigh voltage to provide cheaper power transmission, variable speed drives, radiant heating, solar and wind energy, ocean power, geothermics, cryogenics, controlled fusion, and fissionable materials.

• **Benefit Yields Challenge** — The many advances present a challenge as well as benefits to metalworking. As Ralph J. Cordiner, chairman, General Electric Co., reflects: "One of the major barriers to further progress in many technically advanced fields is that today's designs are pushing the limits of presently available materials."

Small Business Demands Attention

THE NEW CONGRESS will pay a lot of attention to the problems of small business.

Action will center on such men as Sen. John Sparkman (D., Ala.), head of the Senate Small Business Committee; Rep. Wright Patman (D., Tex.), House Small Business Committee chief; and Rep. Thomas Curtis (R., Mo.), a member of the House Ways & Means Committee, where all tax legislation originates.

H.R. 2, a bill introduced by Rep. Frank Ikard (D., Tex.) represents the sort of legislation small business protagonists think must be passed. (Representative Curtis introduced an identical bill this session. Both introduced identical bills in the last Congress.) Representative Ikard describes the bill this way: It authorizes a deduction from taxable net income. The amount equals the addition to capital represented by reinvestment in depreciable assets, inventory, and accounts receivable. Maximum deduction would be 20 per cent of net income or $30,000, whichever is less.

Both Congressional small business committees and the Ways & Means Committee have O.K.'d the principles H.R. 2 stands for. Representative Curtis notes that the bill is not special privilege legislation because its provisions apply to all firms, incorporated or not. Pressure is being applied to the Ways & Means Committee to conduct early hearings on the measure.

Senator Sparkman has introduced S. 2, identical to H.R. 2. About two dozen other senators are co-sponsoring the bill. The senator, long concerned about "the wave of mergers," provides this analysis of the situation: "To the degree that business deaths and mergers are caused by the inability to secure adequate financing for growth and expansion (and thus remain competitive), tax adjustment based upon reinvestment of earnings will provide effective relief."

Representative Patman has introduced five bills designed to aid small firms. All are amendments to the Clayton Act, the Robinson-Patman Act, or the Federal Trade Commission Act. Believing S. 2 and H.R. 2 do not go far enough in providing the economy a quick jolt, he will probably introduce a bill calling for a writeoff of $1 million worth of new capital equipment in one year. Representative Patman says that "some substantial direct incentives for modernization" are needed now.

● **Senator Sparkman's concerned about the wave of mergers**

● **Representative Patman will push incentives for capital spending**

● **MORE METALWORKING BILLS**—By the end of the first week of the new Congress, 287 bills had been introduced in the Senate and 2330 in the House. Three bills affecting metalworking stand out:

Sen. Everett Dirksen (R., Ill.), "with misgivings," introduced S. 256 to raise the minimum wage to $1.10 an hour and provide some additional coverage. (The Kennedy plan calls for $1.25 an hour.) Senator Dirksen warned that most of the effect of the measure would be on small business. He also introduced a Senate joint resolution for the creation of a commission to report on the influence of foreign trade upon business in the U. S.

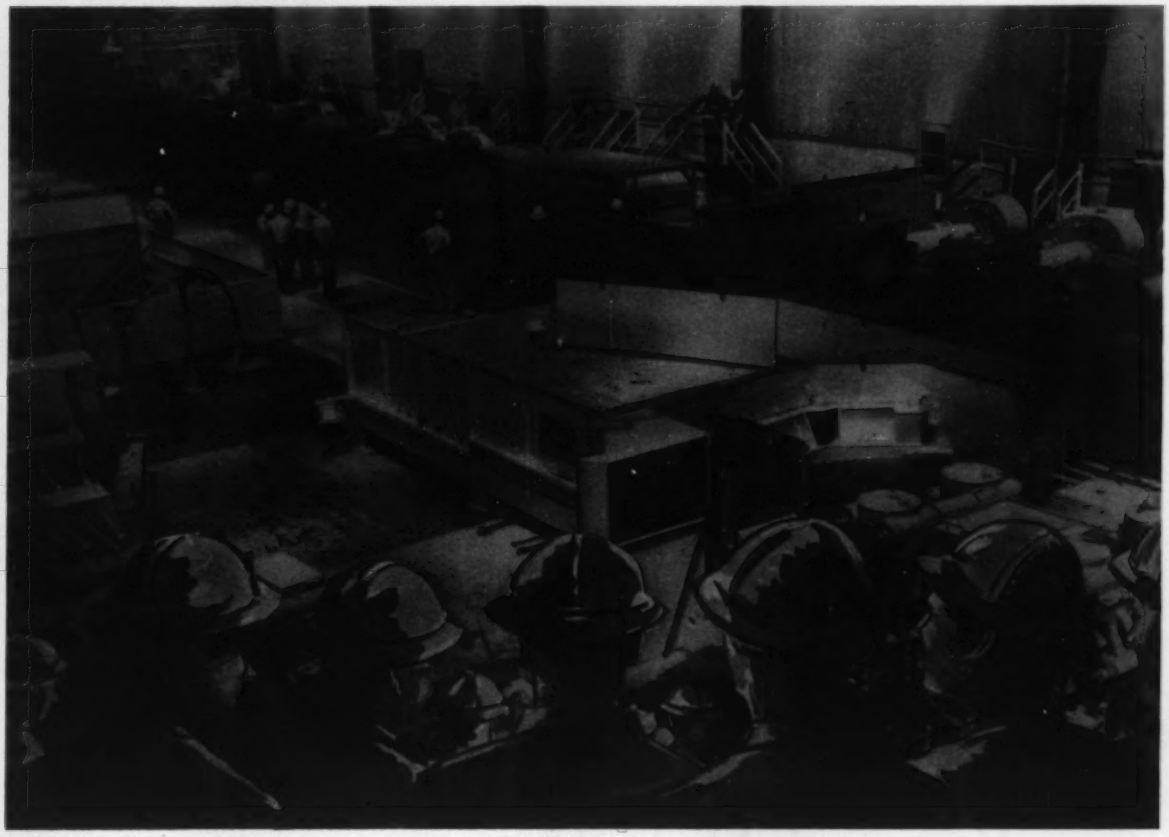
The Senate minority leader dropped S. 9 into the hopper. The depressed areas relief bill calls for an outlay of $180 million. Another such bill (S. 1) introduced by Sen. Paul Douglas (D., Ill.) and co-sponsored by 43 other senators would cost $300 million. Sen. Hugh Scott's (R., Pa.) bill (S. 6) would cost $200 million.

Sen. Alexander Wiley (R., Wis.) and Sen. Alan Bible (D., Nev.) want to establish a "Hoover-type" commission on federal taxation to submit periodic reports to Congress on needed tax legislation.

Sen. Estes Kefauver (D., Tenn.) reintroduced a bill (S. 11) to prohibit the defense of "good faith" when meeting a competitor's price cut where it can be shown competition may be lessened or a monopoly created.

● **BUY AMERICAN** — Rep. Samuel Stratten (D., N. Y.) wants the Buy American Act differential on government contracts set at 25 per cent instead of the present 6 per cent. He asks, too, that the Development Loan Fund, when making purchases in the U. S., give preference to large unemployment areas.

There's World-Wide Interest
IN MORGAN CONSTRUCTION COMPANY'S
Fastest 10″–3 Strand Rod Mill



View shows a portion of the finishing mill and the second of three 180° repeaters in the foreground.

Rolling mill people from all over the world—from Australia, Belgium, Canada, France, Luxembourg, Mexico, Germany and England have visited the Kansas City plant of the Sheffield Division, Armco Steel Corporation to see the new No. 2 Morgan Rod Mill in operation.

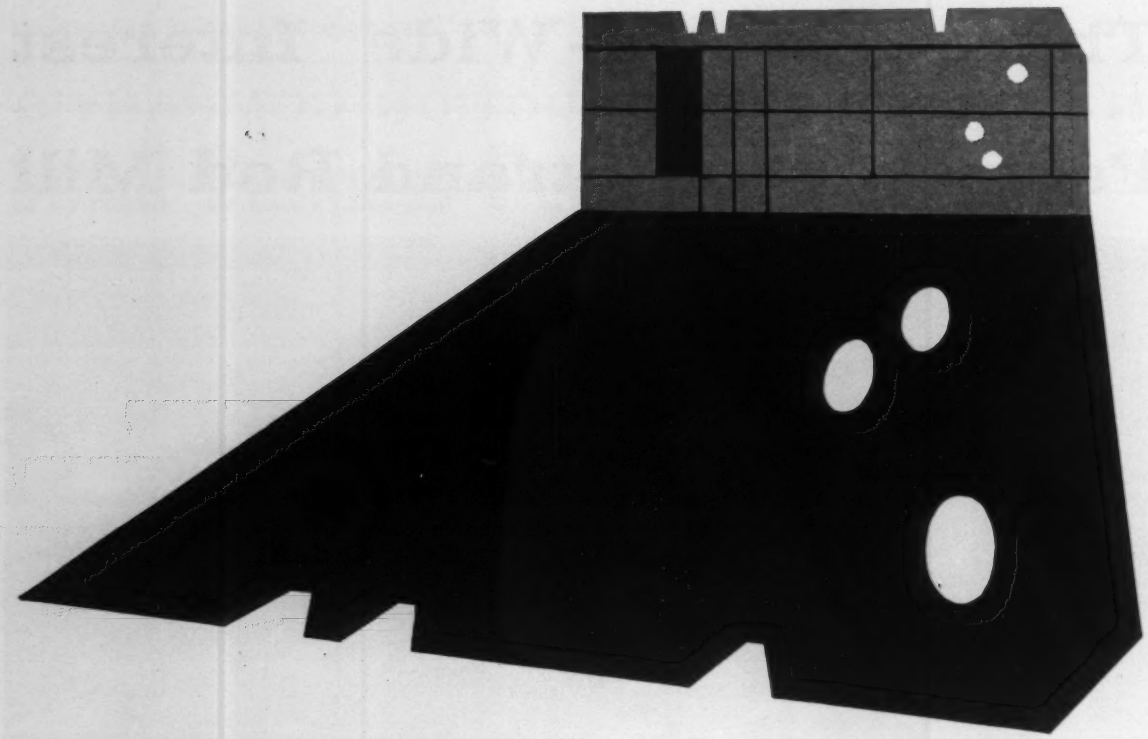
The new Morgan 3-strand - 10″ Rod Mill is just one more example of top quality creative engineering at work. The most modern concepts of mill design have been incorporated in the new mill and preliminary estimates indicate that the new installation will more than triple previous production.

The Morgan Construction Company offers more than seventy years of accumulated rolling mill experience, since their development of the first continuous rolling mill in this country.

MORGAN
WORCESTER

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS
ROLLING MILLS • MORGOIL BEARINGS • GAS PRODUCERS
WIRE MILLS • EJECTORS • REGENERATIVE FURNACE CONTROL

RM-95



Now! A low-cost way to automate plant control—

Keysort® Data Processing

For the up-to-the-minute reports you need in the establishment of profitable plant management—reports in such vital areas as labor costing, operation costing, production and inventory control, application of burden rates—Keysort is the data processing system to use.

Designed for economical plant control

The reasons are many. No restrictive procedures; minimum training; remarkable economy; simplicity of installation and operation.

Keysort, in fact, is the only automated data processing system flexible enough to fit your company as it stands *and* as it grows. It is the one system adaptable and affordable to companies of every size.

Easy to use in factory and office

With Keysort you use punched cards—mechanically created for fast, easy sorting. Figures are automatically tabulated and results summarized direct to reports.

Result: Keysort automates your data processing to give you the meaningful on-time information you need for complete control of your plant and your profits. Monthly, weekly, daily. And at truly low cost.

Read about Keysort in action

Your nearby Royal McBee Data Processing Systems Representative has had a wealth of experience in solving plant control problems. Working with your plant managers and foremen, with your systems and procedures experts, he can offer helpful advice about a low-cost Keysort system tailored to your individual requirements. Call him, or write us at Port Chester, N. Y.—indicating the applications in which you are interested—and we will be happy to supply you with actual case histories from our files.

ROYAL McBEE *corporation*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

WHIRLPOOL CORP. had record sales in 1960, but profits ran nearly one-third lower than they did in 1959.

WORTHINGTON CORP. shipped $12 million more products in 1960 than it did in 1959, but net income dropped 30 or 40 cents a share.

CONTINENTAL MOTORS CORP. reported nearly equal sales in both fiscal 1960 and 1959, but net income dropped $1.2 million in the 1960 period.

Whatever your corner of metalworking, odds are that your company faces this problem: Diminishing profits (and sometimes greater losses) even when sales climb. In 1950, the average manufacturer had a return on sales, after taxes, of 6.5 per cent. Today, it's 4.5 per cent. (In 1960's third quarter, it was only 4.3 per cent.) If the trend continues, we'll be squeezed to a 3.5 per cent return by 1964.

What can we do to brake the trend? A look at the causes first may suggest remedies which can start you on a plan for profit growth.

Defend Against Profit Squeeze

Many factors account for the declining profit margin in metalworking, but these stand out:

• **Pressure for Consumer's Dollar**—Our industry is losing its traditional share of the consumer's dollar—at a time when rising personal income and increasing leisure are boosting the standard of living, so that more people should be buying more durable goods. In 1950, durables accounted for 20.5 per cent of gross national product. In 1959, the share was 19.1 per cent. In 1960, it was less than 19 per cent.

Metalworking needs to offer better values in market areas—sport goods, servicing equipment, for example—which are attracting a growing proportion of the consumer's dollar.

• **Pressure from Competitive Materials**—One part of the problem is increasing competition from nonmetallics—plastics, glass fibers, ceramics, concrete, even a revitalized wood industry. Production of plastics, for example, has increased 186 per cent in a decade. Steel ingot output last year was 2.6 per cent more than it was in 1950.

One solution: Combine metallics

and nonmetallics, such as plastic coated steels.

● **Pressure from Abroad** — Many managers suspect part of our profits has gone abroad. While our business limps along at a disappointing pace, steel mills, auto plants, and other metalworking establishments of Western Europe and Japan are operating at near capacity. They are supplying more goods to the new world market. We are supplying relatively less.

We can improve our performance overseas and compete better against imports if we adopt a world concept, audit the competition's and our resources, know the market, fight the credit war, improve service, strengthen technology, sharpen product design, and enlighten employees about the dangers and potentials of the new world market.

● **Pressure from Wages**—Another factor contributing to the profit problem is the ever present pressure for higher wages and fringes. Metalworking has given more than other industries. Average weekly gross earnings in primary metal industries climbed from $67.24 in 1950 to about $109 in 1960. By contrast, wages in the wood products industry rose from $55.31 in 1950 to about $82 in 1960.

We need to get more value from the $58 billion metalworking will pay in wages, salaries, and fringes during 1961. Ten ways to boost your people's efficiency:

1. Know where you're going.
2. Know how you want to get there.
3. Pick the right people to help.
4. Let them know what you're doing and why you're doing it.
5. Know what motivates them.
6. Give them the right tools to do their job.
7. Demand their best effort.
8. Reward them fairly for their best effort.
9. Lead them (or they'll lead you).
10. Follow through: Check performance, praise progress, point out problems, appraise results.

● **Pressure of Indirect Labor**—In 1950, we had 18 indirect workers (11 nonsupervisory whitecollar people and 7 in management) per 100 employees in metalworking. Today, we have 28 (18 nonsupervisory and 10 management).

That rate of increase shows little sign of losing momentum. We need to increase the effectiveness of that group via improved means of studying its productivity and measuring its performance.

● **Pressure from Excess Capacity**—The steel industry is operating at only about 50 per cent of capacity now and will consider itself fortunate if it averages 70 per cent for all of 1961. Almost every metalworking industry is operating today at less than 70 per cent of capacity. Unused facilities add cost to the products now being made. The damage to profit margins is great.

An urgent requirement in planning for profit growth is better planning for facility expansion.

● **Pressure from Government**—Government regulations retard profit growth, particularly in the area of tax depreciation policies.

You can get relief by campaigning more for reform and by cleaning up your own bad practices. In depreciation, for example, only 60 per cent of industry has taken advantage of partial reforms passed by Congress in 1954.

Regard profit improvement as the way to . . .

DON G. MITCHELL, president, General Telephone & Electronics Corp.

Play the Offense on Profits

Those are some of the serious pressures on profits, and those are some of the remedies to relieve the squeeze. Although the approach is important it is primarily defensive. How can you take the offense?

Says Don G. Mitchell, president of General Telephone & Electronics Corp., New York: "I admit that one way of increasing your profits is to cut your cost. But the purpose of the old 'economy drive' quickly gets lost because everything within striking distance gets economized.

"In 1946, we decided we would not have an economy drive. We would try a more positive approach, based on the fact that you make money by spending money—spending it intelligently. We formed a Profit Improvement Committee, comprised of the heads of various operating and staff organizations."

The group discovered two major types of profit improvement: The new project that may cost millions but will return the investment and much more; the improvement of a machine, process, or technique you already have.

Of the many other things the "flying circus" learned, says Mr. Mitchell, these stand out:

stop spending useless money . . . ***and spend more useful money***

"1. We tend to forget there never is enough money for everybody to do everything. You can't approve every project simply because it will make money.

"2. For the truly big project—the one with the unusual profit improvement opportunity—there is always money.

"3. A top committee has to have someone take its decisions down the line and sell them. That's because decisions have a habit of not working their way down to the place where the job must actually be done."

Adds Mr. Mitchell: "Our profit improvement philosophy has conservatively more than doubled the improvement we normally would have been able to expect."

As part of the positive approach to profit improvement, experts advise that you:

• **Manage for Profit Growth**—Westinghouse Electric Corp. has a profit pattern concept that provides for the segregation of income and cost data according to the factors which cause them to change. That provides a means for evaluating the effect on profits of such factors as price levels, sales volume, product mix, changing labor and material rates, and cost reductions through redesign and methods improvements.

By segregating the elements of profit performance in those categories, the concept reveals to management the general lines of approach which must be taken to improve results. Once that is done, specific plans for action and tools for improvement can be used, points out Marshall K. Evans, director of management services for Westinghouse.

• **Create for Profit Growth**—The creative climate is often lacking in industry. Managers approach too many of their problems by the book. Needed is special handling for your creative people who dream up the ideas that make your profits grow.

Industry can encourage creativity by hiring the right people, providing them with the right supervision in the right climate.

• **Invent for Profit Growth** — We need inventions to create new industries. The development of the auto led to an industrial complex that was a big factor in the boom of the 1920s. What's comparable on the horizon for the 1960s?

We require more than new product ideas. We need a new family of products. Will it be coming in high energy forming? Nucleonics? Or is it already here (in electronics) but not yet fully developed?

• **Labor for Profit Growth** — The auto negotiations that begin next summer will remind us that labor and management have yet to develop peaceful ways to settle their differences. Strikes cost more than the $13 billion in lost volume during the 1950s.

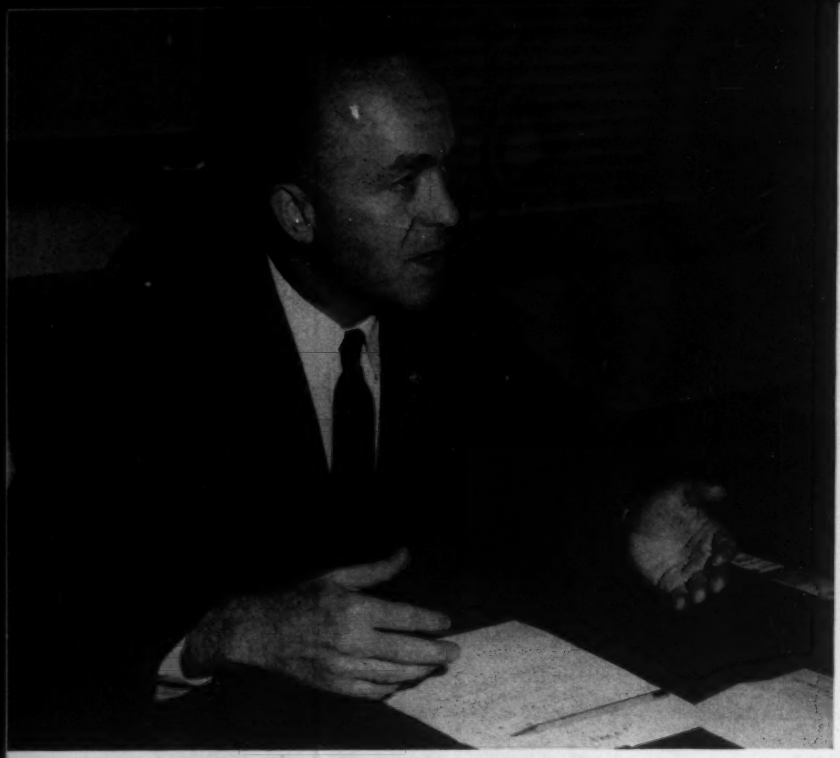
Perhaps we need a marketing approach rather than old style bargaining in industrial relations. Good marketing is based on good research, product planning, and selling. Marketing applied to industrial relations would require:

1. Research to learn what your workers and other interested parties want.

2. Planning to make your program as acceptable as possible to all.

3. Selling the year around to convince as many as possible that you merit their approval.

• **Export for Profit Growth**—Experts say that our hope of industrial expansion lies in better development of exports in new world markets. The most promising areas are in



Our people must be made to realize that foreign competitors can capture our markets if our labor costs get out of hand

WILLIAM L. WEARLY
President, Joy Mfg. Co.

Canada, Japan, and Western Europe.

The underdeveloped areas of Latin America, Africa, and Asia are already promising markets. They'll be even better in the decades ahead, so it's wise to get in on the ground floor now.

• **Market for Profit Growth**—The marketing of industrial products at home needs new dimensions. Much of the durable goods sold since World War II has been for expansion. The domestic replacement market will be the big one from now on. It requires new approaches. Profit growth can also come from new domestic markets. American Machine & Foundry Co., New York, has profited from the bowling craze.

The government market requires more scientific study. What do federal, state, and local governments need? How do you sell to them? Firms like Atlantic Research Corp., Alexandria, Va., have achieved dramatic profit growth by selling almost exclusively to the government.

• **Be Reliable for Profit Growth**—The Space Age places fantastic demands on metalworking—and not just the missilemakers. All customers want products that will perform better longer. And they want the quality at no—or little—extra cost. Result: Emphasis on reliability promises to become one of this decade's most significant trends. It costs money, but the expense can be offset with improved sales. The company that can deliver reliability will get the business—and the profits.

• **Design for Profit Growth**—In bridge construction, for example, plastic design can save one-third in weight of steel compared with conventional design. Design changes from end product to component can lead to reduced costs, better appearance, better performance—with resulting profit growth.

• **Inform for Profit Growth**—Managers are often weak in communicating—both with other managers and with people reporting to them. Result: Unnecessary or misdirected effort and profit shrinkage.

Another kind of communications brings trouble too. Our technology is developing so rapidly that we have difficulty keeping pace with the changes. We have made only a start in finding techniques to disseminate technical knowledge from all sources—foreign and domestic. More and better approaches will bring more and better technology to metalworking.

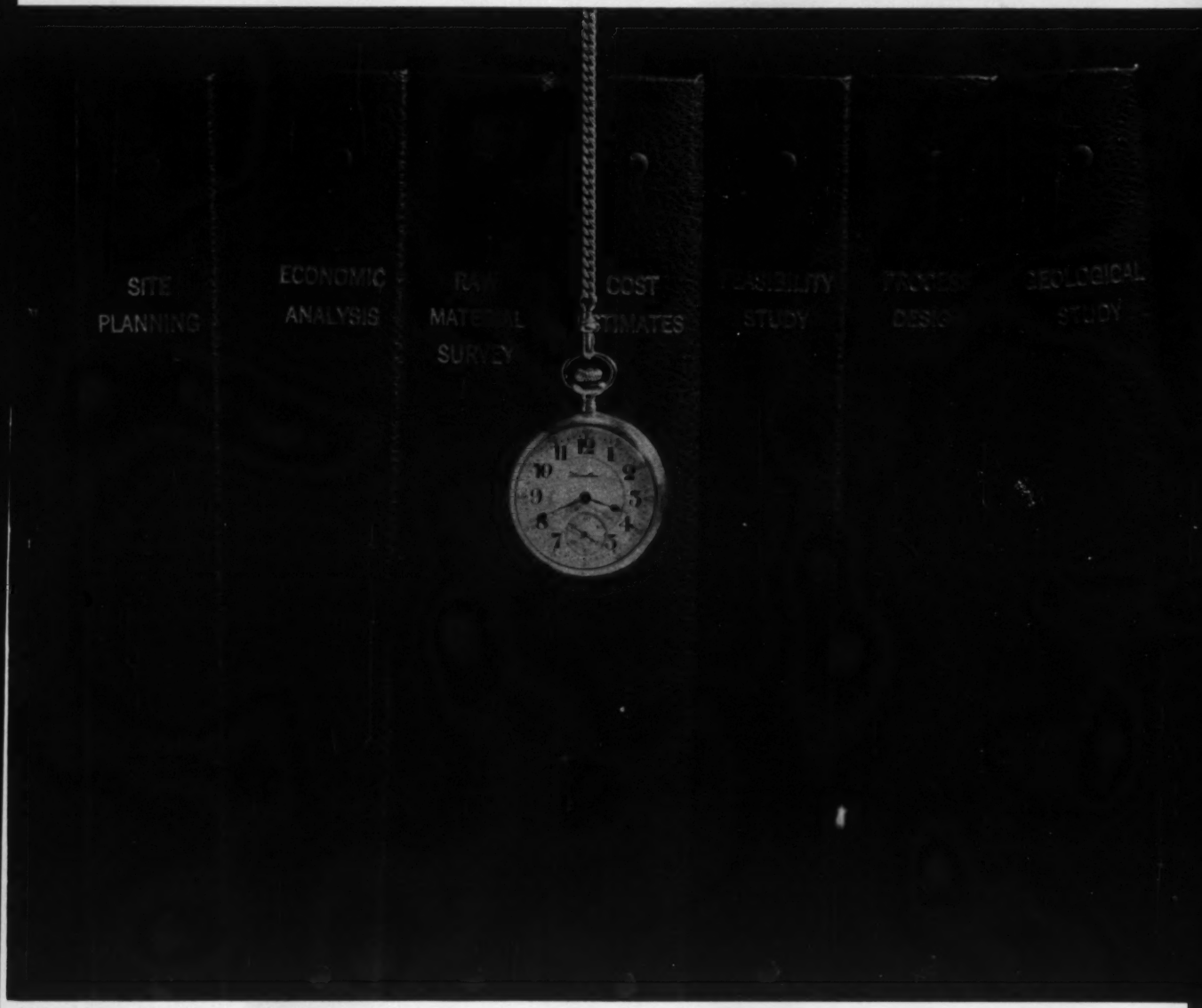
"Although many companies do suffer from a profit squeeze, they don't have to," says Bertrand J. Belda, central district director of management services for Ernst & Ernst, Cleveland. "Dramatic improvement in earnings can be realized, especially by taking advantage of the rapid advances in managerial techniques, marketing, and technology."

PROFIT GROWTH

The Profit Micromargin

On Jan. 30, STEEL will carry the second in its 1961 Management Series. Installments will appear every other week for the rest of the year and will cover subjects outlined in the accompanying article. For a free copy of any or all in the series, write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...



Timely? Many complex factors shape the final decision to proceed with your expansion plans...and timing is an important one. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers designs and builds for the Steel industry...offers skilled experience in all types of facilities from raw material plants to finishing mills. From Pre-Engineering through design and construction, Kaiser Engineers provides complete, one-company service and ingenuity based on years of experience.

KAISER ENGINEERS

KAISER ENGINEERS engineers-contractors
Contracting since 1914

Oakland 12, Calif. — Chicago, New York, Pittsburgh, Washington, D.C.
Accra, Buenos Aires, Montreal, New Delhi, Rio de Janeiro, Sydney, Vancouver, Zurich

6228-S

Lower Costs — Increase Profits with

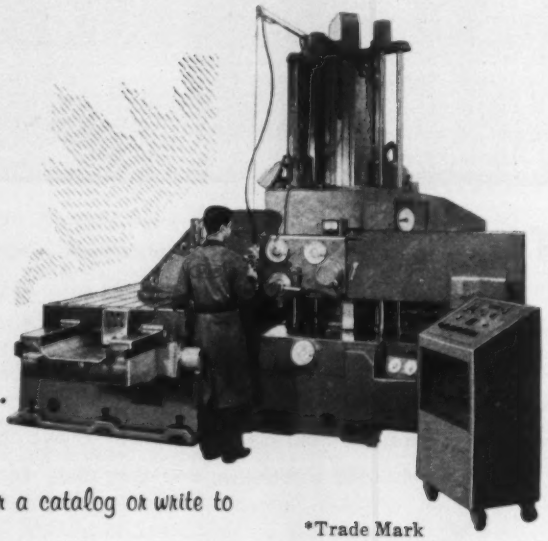
CENTRALIZED POWER CONTROL

..... on the BULLARD DYNAMILL* H.B.M.

Large, easy to read clock-type dials allow the operator to "power" position the head, table, saddle and spindle in relation to the work piece without the use of hand cranks or levers. These dials, when the machine is equipped with numerical control, provide an accurate, instantaneous visual read-out on the positioning of the system.

Simple push buttons on the control pendant direct all motions of the head, table, saddle and spindle. Spindle start and stop, as well as spindle speed changes, are controlled from buttons on the pendant. Four traverse rates and feed engagement are actuated by the operator's forefinger on the pendant trigger.

Thus, within the span of a man's hand, are centralized power controls which allow the operator to keep the tool in the cut more of the time — thereby reducing costs and increasing profits.

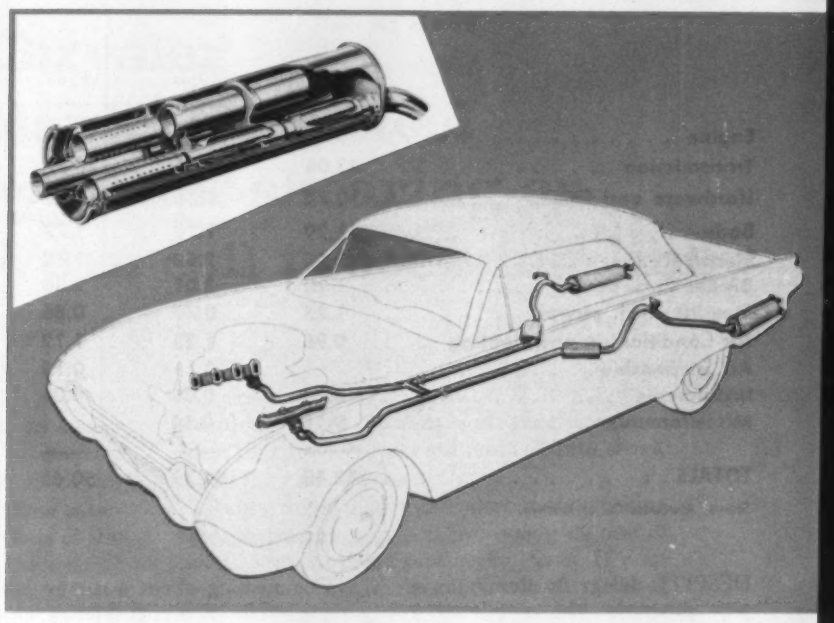


For Complete Information,
ask your nearest Bullard Sales Office for a catalog or write to

*Trade Mark

THE BULLARD COMPANY • BRIDGEPORT 9, CONNECTICUT

Another front has been opened in the battle for longer lasting exhaust systems. Allegheny Ludlum Steel Corp. initiates drive as . . .



Thunderbird Gets Stainless Muffler

A MODIFIED 410 stainless steel that costs about a third less than the conventional grade is being used for critical inner parts of 1961 Thunderbird mufflers (the inner shell, heads, and one baffle). The highly corrosion resistant material may be Ford Motor Co.'s answer to ceramic coated mufflers (STEEL, June 6, 1960, p. 69). Allegheny Ludlum Steel Corp. developed the steel. Arvin Industries Inc., Columbus, Ind., is the muffler supplier.

Allegheny calls its new stainless MF-1. It was developed for mufflers. Test samples show it contains 11 per cent chromium and 0.36 per cent titanium to aid corrosion resistance and to make for better formability and weldability. Finish is unimportant since the parts aren't visible. The material will sell for 25 to 33 cents per pound vs. 13 to 14 cents for aluminized steel and 7 cents for carbon steel.

Trade sources tell STEEL they think Allegheny can make the material for less at its West Leechburg, Pa., plant, because it uses a tandem mill and can eliminate one pickle and anneal operation.

A second grade, MF-2, appears to be slated for other specialized markets.

• **Qualifications**—"A muffler is as strong as its weakest link," says Thomas A. Danner, Arvin's vice president-engineering. Ford. studied muffler failures to find the "weak link" and switched to stainless in the most vulnerable areas.

For practical purposes, the T-Bird system could be called a stainless muffler. In any case, it's the first modern U. S. car to use stainless in any part of its exhaust system.

• **Long Lived**—Mr. Danner says there isn't enough information available to predict how long the new muffler will last. (Ford has no plans to extend its warranty period.) But industry sources believe the average Thunderbird owner should get four years from his exhaust system if he isn't a stop-and-start driver. So it appears to be comparable to Rambler's ceramic coated muffler—it is guaranteed for the time the car is used by the original owner. Ceramic replacement mufflers sold by Sears, Roebuck & Co. carry a five year warranty.

In designing the muffler, Arvin subjected the stainless to accelerated corrosion tests, using liquid condensates from engine exhausts. Mr. Danner reports the MF-1 steel lasts 2100 hours, compared with 900 hours for aluminized and less than 400 hours for carbon steel. He says his company is also considering the stainless for a line of replacement mufflers, but it needs

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

Alcoa Predicts Rising Use of Aluminum for Cars

(Pounds per car)

	1961	1960	1959
Engine	20.20	18.99	15.75
Transmission	23.04	18.43	16.97
Hardware and Trim	10.78	8.36	10.18
Body	1.29	1.78	1.77
Electrical	2.98	2.50	1.72
Brakes (incl. power)	1.90	2.01	2.08
Steering (incl. power)	1.25	0.79	0.86
Air Conditioning and Heating	0.96	1.23	1.12
Air Suspension	....	0.11	0.15
Instruments	0.22	0.05	0.05
Miscellaneous	0.18	0.14	....
TOTALS	62.80	54.39	50.65

Source: Aluminum Co. of America.

DESPITE delays in aluminum engine programs, the aluminum industry is still optimistic about increasing its share of the automotive market.

Commenting about a survey just made public, Robert B. McKee, vice president of sales, Aluminum Co. of America, disclosed that the 1961 model car contains an average of 62.8 lb of aluminum—15 per cent more than the 1960s and an all-time high.

"By 1965," he said, "the average car will require at least 115 lb of aluminum."

The next five years, he predicts, will see aluminum bumpers, wheels, radiators, and rear-axle housings on mass produced cars.

George E. Herrman, Alcoa's manager of transportation sales, said the company expects to double the trim average (10.8 lb per car in 1961) in three or four years. Other expected inroads: Wheel covers and hubcaps.

To supply the market, Alcoa has developed three new alloys (5757, M648, 6563) suitable for making bumpers and trim parts.

Design and production problems beset the aluminum engine program (STEEL, Nov. 21, 1960, p. 71). Though it looks like no more aluminum engines will be introduced in 1962, it is believed that more will appear within the next five years (STEEL, Dec. 19, 1960, p. 87).

---

more information on muffler life before determining whether stainless or ceramic would be the best bet costwise.

STEEL sources claim manufacturing costs of comparable ceramic and stainless mufflers would be about the same.

The new muffler could be slightly cheaper than the one it replaced, particularly since warranty costs can be virtually eliminated in pricing out the exhaust system.

In making the change, Ford made a switch from galvanized to aluminized steel for the outer muffler cover. The other parts are also aluminized.

• **Long Look**—So far, this is a limited market for Allegheny. Arvin uses 7 lb of MF-1 steel in 0.036 and 0.048 in. thickness in each of the mufflers (the two resonators don't need it). The applications add up to a gross of 14 lb per car, says Mr. Danner. If Thunderbird volume continues at the 1960 level (90,000 units), it means that 1.2 million lb of the stainless will be used for T-Birds alone. If MF-1 proves successful, Ford probably will adopt it for some other lines.

Exhaust Notes

• Full sized 1961 cars are using 15 per cent more zinc than they did in 1960, reports the American Zinc Institute.

• Ford Motor Co. will introduce a new 262 cu in. truck engine next month that will cut operating costs by 12 per cent. The engine turns out 152 hp and cost $3.4 million to develop, says Will Chase, Ford Div. marketing manager.

• American Motors Corp.'s "buy Rambler" campaign will pay off 34,324 customers who purchased cars in December. George Romney, AMC president, says December sales show a 13.8 per cent increase over year-ago levels so each buyer will get a $25 U. S. savings bond.

U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
July	434,377	555,410
August	305,527	239,152
September	407,685	258,151
October	617,816	507,527
November	597,132	254,527
December	522,239	494,931
Totals	6,694,354	5,593,707

Week Ended	1960	1959
Dec. 10	135,328	86,566
Dec. 17	130,711	152,449
Dec. 24	114,941	103,219
Dec. 31	86,497	112,113
	1961	1960
Jan. 7	74,513†	163,249
Jan. 14	90,000*	173,713

†Preliminary. *Estimated by STEEL.
Source: *Ward's Automotive Reports.*

Vaughn Haynes, right, manager of production engineering, discusses "trap" line scheduling with Wilfred Pascoe, superintendent of press room.

Chrysler blanks strip steel by "trap" shearing on Wean coil processing line

Trapezoidal shearing from coil is, in many cases, the most economical way to prepare blanks for subsequent press operations. Two, independent, pivoting shear heads allow selection of the most economical proportions of the blanks for the finished shapes. This "tailoring" of the material to the end parts eliminates much of the material loss that would result if these same parts were stamped and drawn from square-cut sheets.

Wean has designed and built almost all of the "trap" shear lines used today. The installation shown is at Chrysler Corporation's mammoth Twinsburg, Ohio stamping plant. This Wean coil processing line incorporates strip cleaning, flexing, leveling and shearing operations that turn as-received mill coil into sheet, ready for press work.

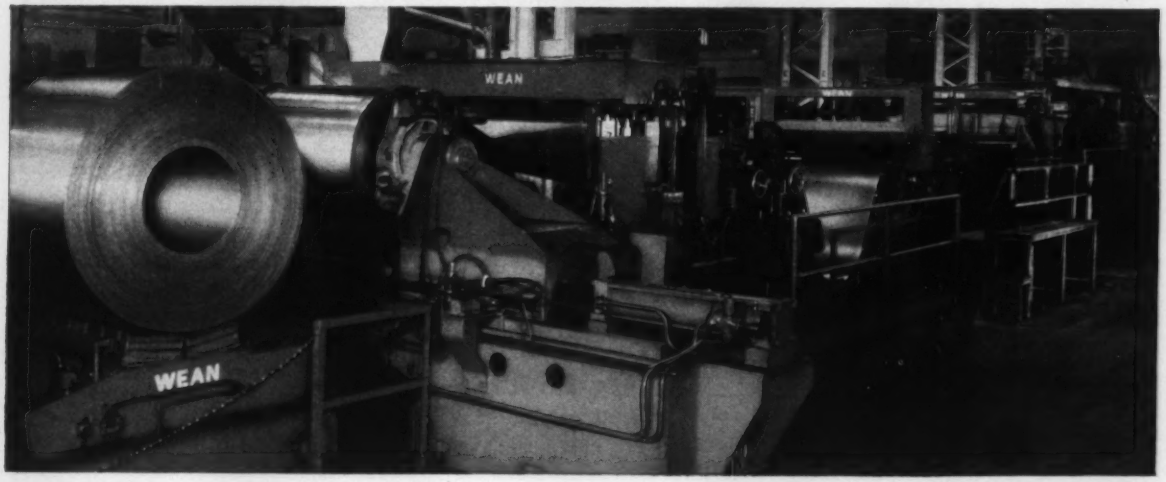
Today, more and more alert metalworking firms are turning to coil processing as one of the answers to rising production costs. If your firm uses approximately 500 tons/month of flat-rolled steel, you may be missing major material and overhead savings if you still purchase in sheet form.

An experienced Wean representative will be able to tell you, or your production executives, if coil processing can cut your costs—and how much. Many firms have amortized the equipment costs involved within one year.

WEAN EQUIPMENT CORPORATION
CLEVELAND 17, OHIO

WEAN

Wean trapezoidal shearing line at Chrysler's Twinsburg Stamping Division plant produces blanks for body stampings from coils weighing up to 30,000 pounds.

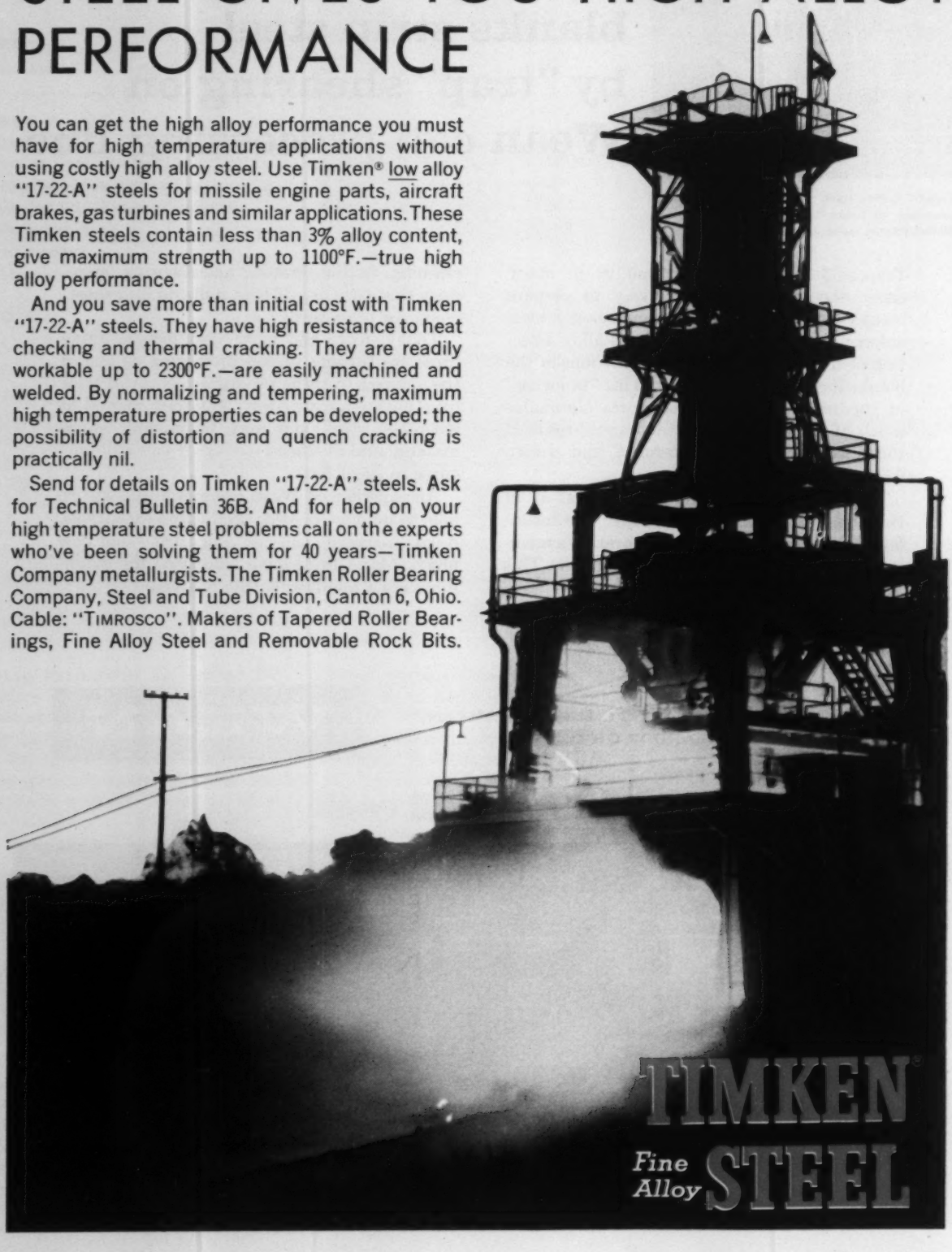


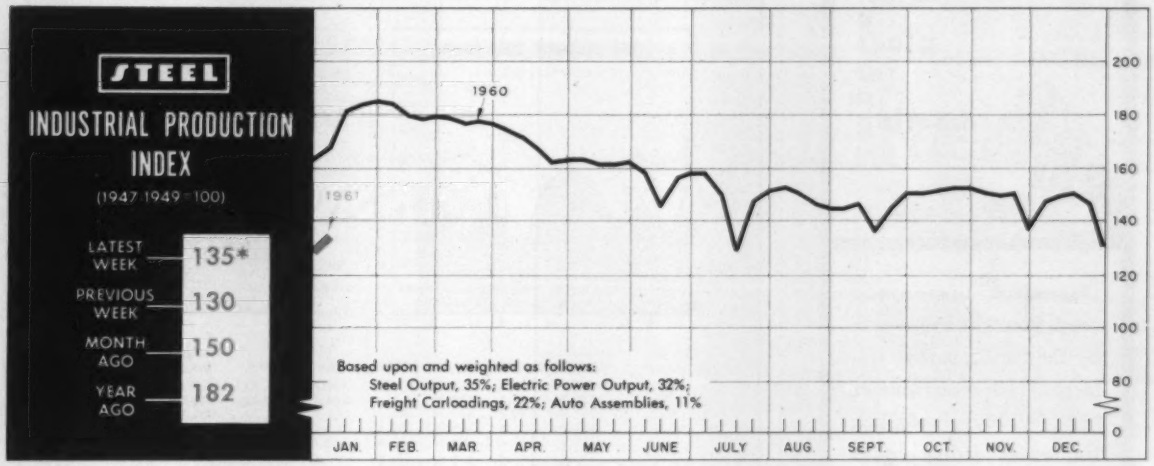
HOW TIMKEN® LOW ALLOY STEEL GIVES YOU HIGH ALLOY PERFORMANCE

You can get the high alloy performance you must have for high temperature applications without using costly high alloy steel. Use Timken® low alloy "17-22-A" steels for missile engine parts, aircraft brakes, gas turbines and similar applications. These Timken steels contain less than 3% alloy content, give maximum strength up to 1100°F.—true high alloy performance.

And you save more than initial cost with Timken "17-22-A" steels. They have high resistance to heat checking and thermal cracking. They are readily workable up to 2300°F.—are easily machined and welded. By normalizing and tempering, maximum high temperature properties can be developed; the possibility of distortion and quench cracking is practically nil.

Send for details on Timken "17-22-A" steels. Ask for Technical Bulletin 36B. And for help on your high temperature steel problems call on the experts who've been solving them for 40 years—Timken Company metallurgists. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.





*Week ended Jan. 7.

Slow Start to Give Way to Fast Finish

DECIDING which of the 1961 business forecasts suits you best is a gamble that's typified by the old time side show barker's spiel: "You pays your money and you takes your choice."

The forecasts vary all over the economic map, but a shaky consensus runs something like this:

A strong finish will overcome a weak start, resulting in a gross national product of something over $510 billion for the year (compared with about $504 billion in 1960). But it won't be enough to push the industrial production average above the 1960 level. Consumer income will remain relatively strong, assuring a continued rise in personal consumption spending, but most of the advance will be in nondurables and services. Construction will advance to a bit over $57 billion (up 4 per cent from 1960) with a pickup in housing and public construction overcoming a lag in industrial work. Plant and equipment will be off, but less than in most slow periods.

Why a shaky consensus? Three reasons: 1. There are noticeably fewer forecasts in the second year of the "Sizzling Sixties" than at the outset. (Too many fingers got burned last year.) 2. Those brave enough to try again this year are understandably cautious after missing the mark on the high side in 1960. 3. The recession has not run enough of its course to give a good indication of when the turn will come.

• **Convincing Logic** — Still, the analysts feel that this will be, as first suspected, a mild recession. There is substantial agreement that the real downturn started in August. If that is so, James Dawson, vice president and economist for the National City Bank of Cleveland, feels it is worth noting that the low point in production and income should be reached by March, on the basis of the pattern of the previous three recessions.

Morgan Guaranty Trust Co. of New York further contends that if further adjustments in inventories

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,400[1]	1,361	2,727
Electric Power Distributed (million kw-hr)	13,900[1]	13,956	14,308
Bituminous Coal Output (1000 tons)	6,610[1]	7,550	7,325
Crude Oil Production (daily avg—1000 bbl)	7,150[1]	7,173	7,112
Construction Volume (*ENR*—millions)	$407.4	$299.5	$231.4
Auto, Truck Output—U. S., Canada (*Ward's*)	98,135[1]	109,214	200,950
TRADE			
Freight Carloadings (1000 cars)	420[1]	406	592
Intercity Truck Tonnage (changes from year ago)	+5.5%	+18.6%	+7.5%
Business Failures (Dun & Bradstreet)	276	253	226
Currency in Circulation (millions)[2]	$33,200	$33,195	$32,519
Dept. Store Sales (changes from year ago)[2]	+4%	+30%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$30,240	$25,336	$25,371
Federal Gross Debt (billions)	$290.2	$290.7	$290.7
Bond Volume, NYSE (millions)	$21.3	$26.7	$32.8
Stocks Sales, NYSE (thousands of shares)	14,363	16,537	18,027
Loans & Investments (billions, adjusted)[3]	$110.4	$110.4	$105.4
U. S. Govt. Obligations Held (billions)[3]	$30.1	$29.8	$27.5
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	215.7	215.8	233.6
All Commodities[6]	119.5[1]	119.5[1]	118.9
Commodities Other than Farm & Foods[6]	127.9[1]	127.9[1]	128.6

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

what a place for a meeting !!!

Dependent upon your need, you'll be impressed by the fact that this, the largest air - conditioned hotel in Maryland, has the exact public room that fits *your* specifications. And your budget.

Lord Baltimore Hotel

Sales Dept.: LE 9-8400

BALTIMORE 3, MARYLAND

TOO BUSY

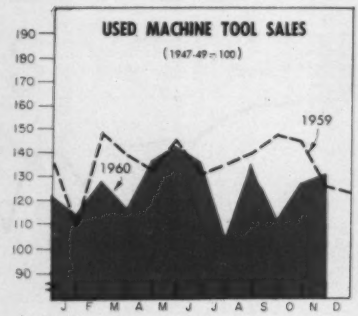
to give up a few hours a year for a health checkup?

Your best cancer insurance is a thorough checkup every year, and alertness to Cancer's 7 Danger Signals.

Learn how to guard yourself against cancer. Write to "Cancer" in care of your local post office, or call your nearest office of...

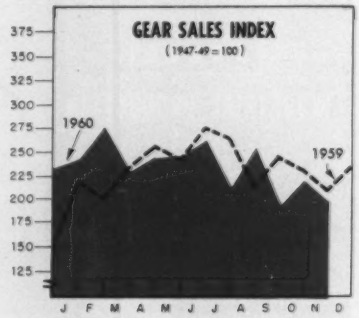
American Cancer Society

THE BUSINESS TREND



	1960	1959	1958	1957
Jan. ...	115.0	109.5	121.1	n.a.
Feb. ...	129.3	148.1	121.9	n.a.
Mar. ...	117.8	139.3	106.3	n.a.
Apr. ...	137.5	132.9	105.0	152.1
May ...	143.2	145.7	99.5	132.6
June ...	137.2	131.3	111.9	137.0
July ...	106.0	135.3	115.0	125.3
Aug. ...	135.4	139.7	93.4	115.6
Sept. ...	113.3	147.8	113.6	117.0
Oct. ...	126.9	145.2	128.8	108.9
Nov. ...	131.2	126.8	122.3	104.5
Dec. ...	....	123.1	135.2	87.7
Avg ...	....	135.4	114.5	128.9

n.a. = not available.
Machinery Dealers National Assn.
Charts copyright, 1961, STEEL.



	Bookings		Shipments	
	1960	1959	1960	1959
Jan. ...	243.4	215.6	207.3	187.7
Feb. ...	278.6	199.9	230.2	201.5
Mar. ...	231.8	234.3	244.6	222.7
Apr. ...	249.2	255.6	234.8	231.8
May ...	246.9	211.0	241.3	223.9
June ...	269.8	274.2	253.6	239.7
July ...	217.5	262.8	210.8	199.8
Aug. ...	255.8	213.3	217.3	201.3
Sept. ..	197.9	213 9	223.5	216.1
Oct. ...	219.9	230 5	220.6	224.1
Nov. ...	198.9	208.7	226.7	224.2
Dec. ...	....	233.9	....	250.2
Avg ...	....	234.7	....	218.8

American Gear Mfrs. Assn.

and retrenchments in capital expenditures are mild (and present indications are that they will be) then the recession will be mild and short lived because end product demand is holding up well. "By midyear—or even before—there is a good chance that the curve of business will be tilted upward again," the bank concludes.

Indicators Looking Better

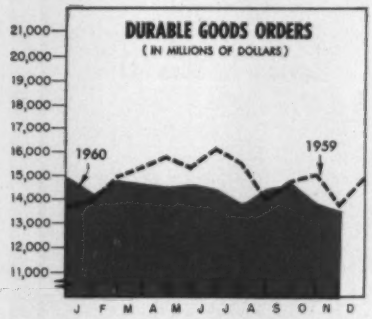
As yet there is little concrete evidence in business statistics to bolster such viewpoints. But it is encouraging to note that the so-called leading indicators are no longer pointing all downward, as they were just a few weeks ago.

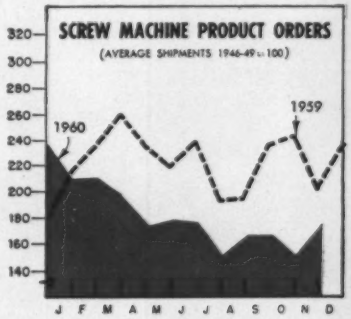
For example, take awards for new housing (in square footage) as reported by F. W. Dodge Corp. (This is the last of ten leading indicators discussed in this column since early November.) It has been on a rising trend since August. This indicator's record as a leader has been better on the up side than on the down side since World War II. It turned up nine months prior to the 1949-50 recovery; ten months ahead of the 1954-55 comeback; and three months before the 1958 recovery.

However, residential awards have fluctuated rather violently at times in the last 13 years without having any noticeable effect on over-all industrial production. Like the other nine leaders, it cannot be used alone as the basis for your business decisions. But taken along with them, a picture of possible second quarter improvement shapes up. Most recent data show that four are advancing, four are still in a full decline, and two are still receding but moving toward neutral ground. Here is how they look individually now:

• **Construction Awards** — Along with residential floor space, construction contracts tabulated by *Engineering News-Record* are setting the pace among the uptrending indicators. They have been strong ever since May, when the total set an all-time monthly record. But like residential housing, this indicator has been known to sound false alarms as to the eventual direction of the over-all economy. On the other hand, construction has been one of the most important antirecession factors in each of the preceding postwar recessions.

• **Machine Tools**—Orders for machine tools have been fluctuating in a narrow range all year. At latest





	New Orders* 1960	New Orders* 1959	Sales* 1960	Sales* 1959
Jan.	14.190	13.900	15.450	13.541
Feb.	14.800	14.918	15.670	13.870
Mar.	14.640	15.323	15.170	14.400
Apr.	14.470	15.796	15.000	15.166
May	14.680	15.241	15.060	15.515
June	14.340	16.133	14.860	15.771
July	13.840	15.493	14.730	15.394
Aug.	14.410	13.974	14.420	14.008
Sept.	14.620	14.747	14.410	14.113
Oct.	13.740	15.099	14.080	14.047
Nov.	13.470†	13.721	13.750†	13.479
Dec.	.....	14.770	.....	15,010

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.

	New Orders 1960	New Orders 1959	Shipments 1960	Shipments 1959
Jan.	209	215	220	193
Feb.	207	236	219	193
Mar.	198	260	241	214
Apr.	174	234	205	219
May	178	219	195	201
June	175	239	207	218
July	152	192	143	194
Aug.	166	194	188	205
Sept.	166	236	186	217
Oct.	152	243	185	243
Nov.	174	201	168	208
Dec.	...	237	...	225
Avg	...	228	...	211

*Preliminary.
National Screw Machine Products Assn.

report, the trend line was slightly up, due largely to foreign orders. (They've been good all year.) It should be kept in mind that this series has only a so-so record as a forecaster, especially in regard to upturns in the general economy.

It is interesting to note that sales of used machine tools were at a fairly high level in the latest month. (See table and graph, Page 56.) The Machinery Dealers National Association points out that sales trends of used tools often indicate the future course of new tool sales.

• **Industrial Stocks**—December was the second consecutive month on the up side for Standard & Poor's industrial stock average. It was at the best level since last May. Its record as a leader is fairly good.

• **Gears**—New bookings for gears have fallen a long way since the beginning of the year, with up and down movements alternating monthly. The latest month was on the down side. (See table and graph, Page 56.) However, the declines appear to have moderated, indicating that the low point is near. As a forecaster of uptrend, however, gears do not have as good a record as some of the others.

• **Layoffs**—Like gear sales, manufacturing layoffs appear to be near the low point. A turn for the better in the near future could be significant because this indicator has one of the better records for pinpointing a change in the direction of the general economy.

• **Durables Orders** — One of the most disturbing factors is the continuing decline in new orders for durable goods. After rallying slightly in the fall, orders have again slumped, hitting the lowest point since September, 1958. (See table and graph above.)

• **Raw Material Prices**—This indicator, with only a fairly good forecasting record, is still heading down at a rate between 1 and 2 per cent a month. There is no end in sight.

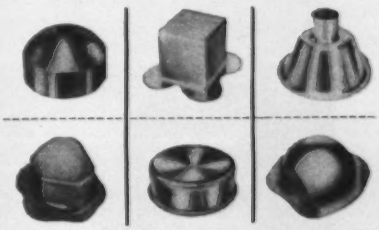
• **Average Workweek**—The workweek has been getting shorter almost continuously since June. At latest report, it was still 39.3 hours, well above the low of the 1957-58 recession, indicating it could continue down for some time to come.

• **New Hires**—This indicator, plotted inversely, is still in its seasonal decline. However, the lack of any upturn in the first half of 1961 could be an indication of future sluggishness in manufacturing activity.

KAUPP
PRECISION-FORMED
METAL
COMPONENTS

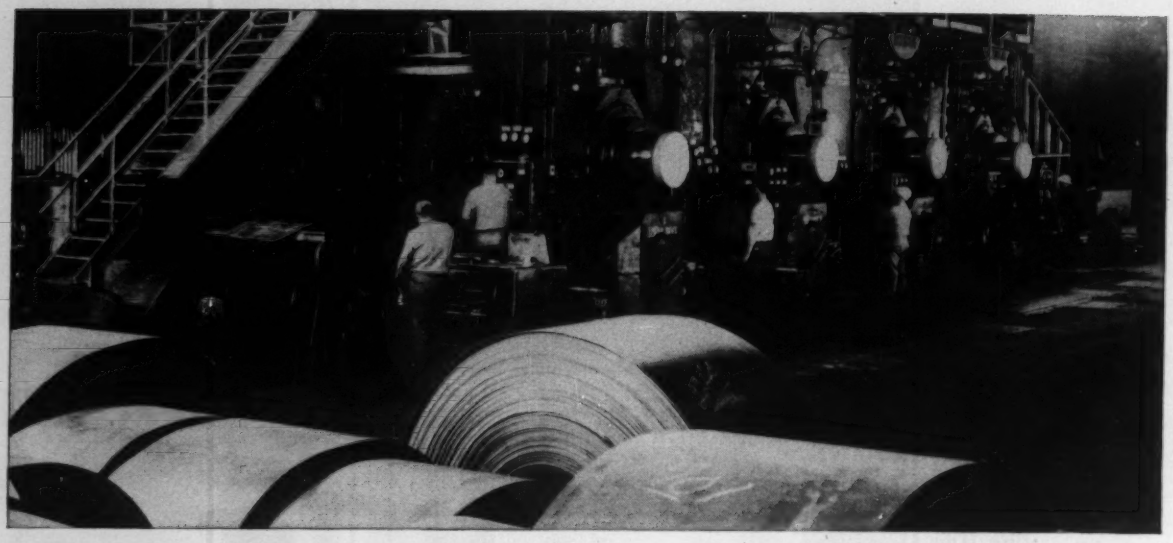
Hydroforming, Deep Drawing and Spinning

You can depend on KAUPP for complete service from design to delivery on precision-made metal parts and sub-assemblies. Ultra modern metal working facilities, plus wide experience on military and commercial requirements are available to solve your problems. Send drawings for quotations or phone for new illustrated bulletins!



Closest tolerances adhered to in all metals, including MU METAL, BRASS, INCONEL, ALUMINUM, COPPER, CARBON STEEL, STAINLESS STEEL, NICKEL, MAGNESIUM, TITANIUM, SILVER, SPECIAL ALLOYS, HAYNES STELLITE.

C. B. KAUPP & SONS
Metal Craftsmen since 1924
NEWARK WAY, MAPLEWOOD, N. J.
Telephone: SOuth Orange 3-2490



Four stand cold strip mill of Granite City Steel Company, Illinois. One of the most powerful tandem cold reduction mills in the U.S.

Heppenstall Sleeve #1727

was in the mill

89 times... and rolled

921,863 tons

At Granite City Steel Company...

Not every sleeve can roll a record... regardless of who makes it. But Heppenstall and Midvale-Heppenstall Sleeves have helped raise some *averages*, too, and that's what we'd like to do for *you*.

Heppenstall and Midvale-Heppenstall Back-Up Roll Sleeves reflect the long experience of two pioneer sleeve producers. Each sleeve's working surface is *tempered to meet your exact hardness specification.*

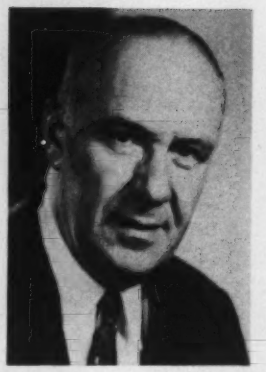
These mandrell-forged sleeves—made from highest quality alloy steel—are worked thoroughly under modern hydraulic presses to produce a finished product having both maximum density and grain refinement. They offer you exactness of fit and greater resistance to cracking and spalling during high-speed rolling.

Heppenstall and Midvale-Heppenstall also produce forged arbors... and have facilities to grind both arbors and sleeves for perfect shrink-fitting.

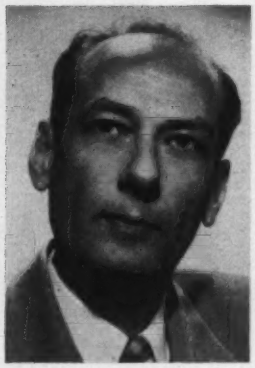
HEPPENSTALL COMPANY
PITTSBURGH 1, PENNSYLVANIA
Plants: Pittsburgh and New Brighton, Pa. • Bridgeport, Conn.

MIDVALE-HEPPENSTALL COMPANY NICETOWN, PHILADELPHIA 40, PA.

Die Blocks • Forgings • Back-Up Roll Sleeves • Rings
Industrial Knives • Materials Handling Equipment
Pressure Vessels • Hardened and Ground Steel Rolls
Vacuum and Consumable Electrode Melted Steels



HOLMES H. WHITMORE
Jones & Lamson president



HARRY C. ROBESON
Detroit Stamping exec. post

MORTON J. REYNOLDS
CF&I plant supt.

GERALD LEWIS
Cooper Alloy v. p.

Holmes H. Whitmore was named president and chief executive officer of **Jones & Lamson Machine Co.**, Springfield, Vt. He has been executive vice president since 1955. **E. S. French**, former president and chairman, continues as chairman.

Harry C. Robeson, vice president-sales, **Detroit Stamping Co.**, Detroit, was named vice president and assistant general manager. He will head sales and manufacturing.

Chris F. Moersch Jr. was promoted to the new post of assistant to the president of **Vulcan Mold & Iron Co.**, Latrobe, Pa. He was a sales engineer with Vulcan, and associated with the company since 1946.

Paul R. Hartig was elected vice president and general manager, **Yale Materials Handling Div.**, Philadelphia, Yale & Towne Mfg. Co. He was general manager of General Electric Co.'s Insulator Dept., Baltimore.

Morton J. Reynolds was made superintendent of **Colorado Fuel & Iron Corp.**'s South San Francisco plant in California. He succeeds **Louis F. Bonofiglio** who will head the Oakland, Calif., plant operation.

Howard H. Clark, assistant general manager, was promoted to general manager, Spring Div., **Eaton Mfg. Co.**, Detroit. He succeeds **E. H. Lindeman**, retired.

Daniel C. McCarthy was elected executive vice president, **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He joined the company last April as administrative vice president. He is responsible for sales, engineering, manufacturing, and accounting departments.

Marshall E. Munroe Jr., general purchasing manager, North American operations, Massey-Ferguson Ltd., Toronto, Ont., was appointed director of procurement of **Minneapolis-Moline Co.**, Hopkins, Minn.

Gerald Lewis was made vice president-marketing and engineering, **Cooper Alloy Corp.**, Hillside, N. J. He will co-ordinate production and sales department activites, and be responsible for new product development.

R. C. Craig succeeds **James McNeal**, retired, as purchasing agent, **Weirton Steel Co.**, Weirton, W. Va., division of National Steel Corp. **W. W. Priest** succeeds Mr. Craig as assistant purchasing agent.

Robert L. Kessler, works manager, Delco-Remy Div., General Motors Corp., was named general manufacturing manager at **Buick Motor Div.**, Flint, Mich. He succeeds **Donald F. Taylor**, named manager of production control and purchasing, a new post.

Howard E. Midkiff was made sales manager, **Cal-Metal Pipe Corp. of Louisiana**, Baton Rouge. He succeeds **Kenneth S. Bayless**, recently elected executive vice president. Mr.

PAUL R. HARTIG
Yale Materials v. p.

DANIEL C. McCARTHY
P&W executive v. p.

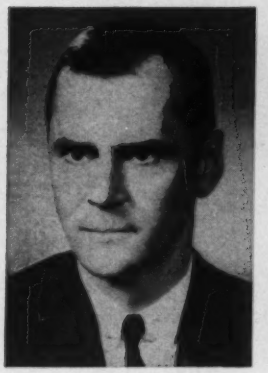
MARSHALL E. MUNROE JR.
Minneapolis-Moline procurement

HOWARD E. MIDKIFF
Cal-Metal Pipe sales mgr.

DONALD T. WYNNE JR.

GEORGE W. BURHOE

Vlchek Tool appointments



KURT H. HAMPEL

WALLACE W. STRATON

Tann Bearing Co. executives

Midkiff was district sales manager in the Tulsa, Okla., office.

Donald T. Wynne Jr. was appointed vice president and manager of the Plastics Div. of **Vlchek Tool Co.**, Cleveland, subsidiary of Pendleton Tool Industries Inc. **George W. Burhoe** was made sales manager of the division.

James H. Richards succeeds **Harry Martin,** retired, as sales manager, Detroit Div., **E. F. Houghton & Co.**

Edward B. Kobylzak was made manager of the newly formed actuator operation of **Saginaw Steering Gear Div.,** General Motors Corp., Saginaw, Mich. The five major subdivisions of the actuator operation (design, production, production control, applications, and tool engineering) are headed by: **David A. Galonska,** staff engineer; **N. M. Ranke,** general superintendent; **L. J. Gunther,** supervisor of production control; **P. V. Wysong Jr.,** chief applications engineer; and **C. L. Sandlin,** senior tool engineer.

Kurt H. Hampel, former manager, Pulley Div., Active Tool Co., joined **Tann Bearing Co.,** division of Tann Corp., Detroit, as general manager. **Wallace W. Straton** was named chief product engineer.

George P. Baumunk was appointed vice president-commercial, **Washington Steel Corp.,** Washington, Pa. He was a vice president of Metal Goods Corp.

Jack R. Snyder was made sales manager, Seezak Div., **Rimak Electronics Inc.,** North Hollywood, Calif. He succeeds **Neil Hales,** resigned.

Dr. Franklin B. Rote was made director of research and development for **Mueller Brass Co.,** Port Huron, Mich. He was vice president, Technical Div., Albion Malleable Iron Co.

Noel S. Siegel joined **Electro-Tec Corp.,** South Hackensack, N. J., as manager of marketing development. He was assistant to the president at New England Instrument Co.

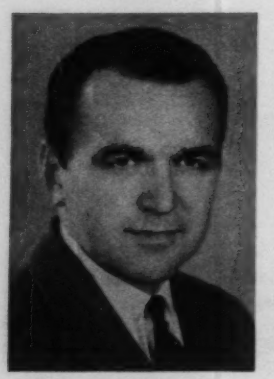
Harry Gardner was appointed manager of **Union Steel Products Co.'s** new Marketing Services Dept., Albion, Mich. He has been general sales manager.

Leslie C. Wolcott was made general manager, **Inland Mfg. Div.,** General Motors Corp., at Dayton, Ohio. He succeeds **John D. O'Brien,** placed on special assignment until retirement Jan. 31. Mr. Wolcott was director of engineering at GM's Packard Electric Div. in Warren, Ohio.

James L. Morrissey fills the new post of director of manufacturing of **Ditto Inc.,** Chicago.

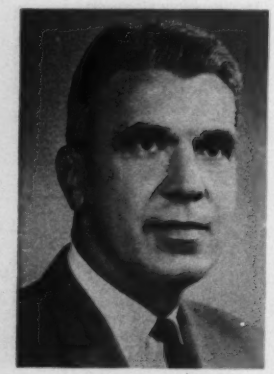
Sheldon Saslawsky was appointed manager, Plastics Machinery Div., **Producto Machine Co.,** Bridgeport, Conn. He was chief engineer with Auto Vac Co.

A. E. Parker & Sons, Howell, Mich., appointed **Edward Farwig** chief en-



EDWARD B. KOBYLZAK

Saginaw Steering Gear post



DR. FRANKLIN B. ROTE

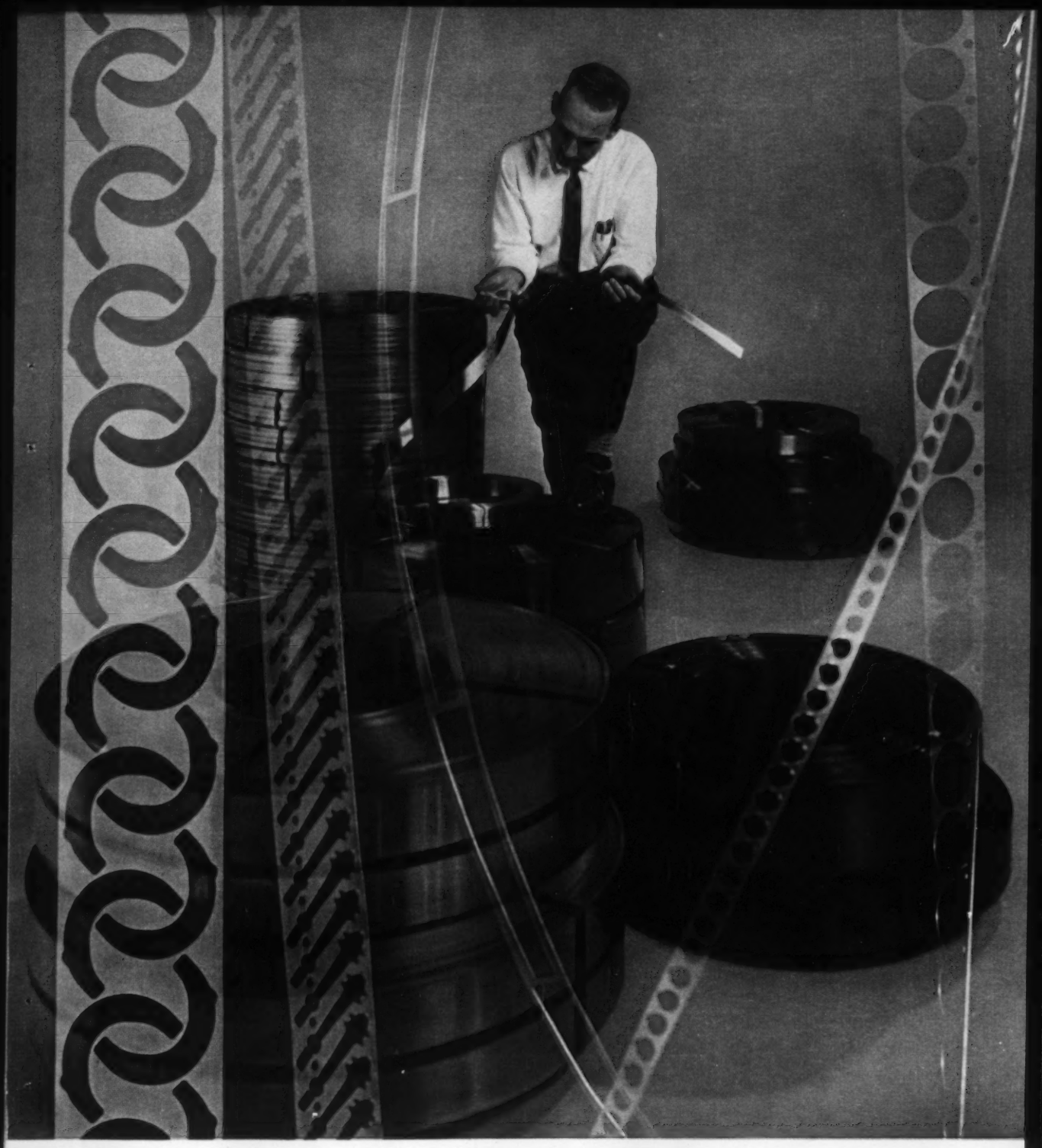
Mueller Brass research dir.

NOEL S. SIEGEL

joins Electro-Tec

SHELDON SASLAWSKY

Producto div. manager



New Roebling Wide Width Tempered Spring Steel makes the most of a good thing

. . . (your money, for instance!)

You count your profits in the number of holes in your scrap. And spring steel that doesn't measure up to the most good parts per inch just isn't the right steel for you.

That's why everybody's talking about new Roebling tempered, cold rolled spring steel. Comes in *any* width up to a full handspan wide. 8⅜ inches, that is, by .005 to .062 inches thick. Think how useful that unique extra width can be in getting extra blanks from a length of steel! The thickness is consistent, too.

Now pick a finish – any finish – blued, straw, or bright – plain or ground, Roebling's got it. Buy Roebling Cold Rolled Spring Steel and you get uniform excellence in temper and finish. Delivery? No problem at all. Get full facts and figures by writing Roebling's Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

NEW MILITARY WORKHORSE EXHALES THROUGH STAINLESS STEEL

HOUSE OF STAINLESS
Helps Sub-Contractor Produce
Close-Tolerance Exhaust Manifold
For New Tactical Truck

Photo courtesy
Dorst Metalcraft, Inc.,
Mayville, Wisconsin

In fabricating a new type stainless steel exhaust manifold for the armed forces' M-151 utility vehicle, Dorst engineers called on the experience of Chicago Steel Service metallurgists.

This help began with the selection of the most economical grade of stainless to meet government specifications. It continued in production areas such as tool design and welding procedures.

Not only did Dorst get the metallurgical and technical assistance they wanted, but through House of Stainless facilities, they also secured the variety of stainless commodities needed for the job. In this case, it included tubular products, fastenings and flat-rolled material.

Wouldn't it pay you to take advantage of this all-inclusive service at the House of Stainless? Keep in mind, it costs you nothing extra to call on our knowledge and experience.

Just phone LAfayette 3-7210

The House of Stainless
STEEL AT YOUR SERVICE JILL

CHICAGO STEEL SERVICE COMPANY

Kildare Avenue at 45th Street, Chicago 32, Illinois · Mailing Address: Box 6308, Chicago 80, Illinois

Milwaukee District Office: 757 N. Broadway, Milwaukee 2, Wisc. Telephone BRoadway 3-7874
Sales Representatives at Bloomington and Rockford, Ill.; Indianapolis and South Bend, Ind.; Davenport, Iowa; Grand Rapids, Mich., Minneapolis, Minn.; Appleton and Wausau, Wisc.

YOUR DEPENDABLE SOURCE FOR CARBON AND STAINLESS STEEL; ALSO INCO ALLOY BAR, WIRE AND STRIP

FRANK IACONETTI
gen. mgr., Clearing plant

CHARLES C. HILTON
Great Lakes Steel supt.

WILLIAM J. EDMUNDS
Kaiser Aluminum div. post

CHESTER F. GIERMAK
Eriez Mfg. sales mgr.

gineer, Verne Doneth plant superintendent.

Frank Iaconetti was appointed general manager of the Hamilton, Ohio, plant of **Clearing Div.**, U. S. Industries Inc. Associated with Clearing for over a year, he previously was plant manager of Elgin Electronics Div. of Elgin Watch Co.

William J. Slawson joined **Daystrom Inc.'s Weston Instruments Div.**, Newark, N. J., as sales manager of Vamistors (precision metal film resistors).

Charles L. Peters was made general manager of **Coldform Div.**, H. K. Porter Company Inc. The division's plant is in Frankfort, Ky. Mr. Peters was plant superintendent. He is now headquartered in the division's Detroit office.

Howard M. Winterson, a vice president of **Blaw-Knox Co.**, Pittsburgh, was named to the new post of vice president-administration.

Charles C. Hilton was appointed superintendent-primary mills at the Ecorse, Mich., plant of **Great Lakes Steel Corp.**, division of National Steel Corp. Former assistant superintendent, he succeeds **R. B. Allard**, retired.

William J. Edmunds was made general manager, Industrial Div., **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif. He replaces **Stanley B. White**, recently made vice president-manufacturing (aluminum) for the corporation.

Robert S. Hatfield was elected a vice president of **Continental Can Co.**, and assigned as general manager of the Eastern (Metal) Div., with headquarters in New York. He succeeds **Orren R. McJunkins**, now vice president-general manager of the newly formed Southern (Metal) Div., headquartered in Tampa, Fla.

James R. Miller was made production manager, **SKF Industries Inc.**, Philadelphia. He succeeds **J. A. Graham**, who joined Bearings Co. of America.

Chester F. Giermak was appointed sales manager of **Eriez Mfg. Co.**, Erie, Pa. He was assistant to the president. He joined Eriez last July. He was general manager, Standard Products Div. and assistant to the executive vice president of Stephens Adamson Co.

J. R. Miller was appointed group vice president in charge of manufacturing, engineering, and industrial relations for **Dana Corp.**, Toledo, Ohio. He was vice president-manufacturing, and is replaced by **E. M. Douglas. P. J. Mazziotti** was made director of engineering.

Russell C. Spera was made vice president-production, **Schaevitz Engineering**, Pennsauken, N. J.

Walter L. Keene was made general manager-operations, **Superior Steel Div.**, Carnegie, Pa., Copperweld Steel Co. He succeeds **J. W. Marrinan**, retired. Mr. Keene was director of research and metallurgy.

Eric L. Sokol was named produc-

CHARLES L. PETERS
gen. mgr. of Coldform

HOWARD M. WINTERSON
Blaw-Knox v. p. adm.

JAMES R. MILLER
SKF production mgr.

WALTER L. KEENE
Superior Steel operations

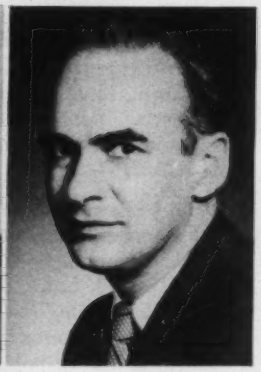
JAMES OAKLEY
Clayton Mark mfg. v. p.

HERBERT O. JOHNSON
Yuba Mfg. gen. mgr.

LUCIUS H. BASSETT
Anaconda Amer. Brass post

ANDREW D. HUNTER
Stamford Rolling Mills mgr.

F. T. HARRINGTON
Foote-Burt marketing



JOSEPH G. WORTLEY
Penn-Harris Steel pres.

tion manager for **Link Div.**, General Precision Inc., Binghamton, N. Y.

Andrew D. Hunter was made general manager and chief executive officer of **Stamford Rolling Mills Co.**, Stamford, Conn., division of Howe Sound Co. Formerly sales manager of Quaker State Metals Co., another division of Howe Sound, Mr. Hunter has been at Stamford Rolling Mills since last May. His new duties include manufacturing and selling.

Oscar L. Dunn was elected a vice president of **General Electric Co.** He is general manager of the Motor & Generator Div., Schenectady, N. Y.

Leroy R. Barr was named general manager, **Lear-Romec Div.**, Elyria, Ohio, Lear Inc. He succeeds **H. C. Andrus**, retired vice president and general manager of the division. **H. J. Downes** was elected vice president of **Lear Inc.**, Santa Monica, Calif., and made general manager, International Div.

F. T. Harrington was made vice president - marketing, **Foote-Burt Co.**, Cleveland. He was vice president of Vickers Inc., division of Sperry Rand Corp.

Joseph G. Wortley, former general manager of the Kenilworth, N. J., plant of Jones & Laughlin Steel Corp.'s Stainless & Strip Div., was elected president of **Penn-Harris Steel Co.**, Harrisburg, Pa., a member of the Steel Service Center Institute.

William W. Holloway Jr. was named assistant director of purchases, **Wheeling Steel Corp.**, Wheeling, W. Va. **Michael P. Apostolik** succeeds **Roth N. Clemans** who retires Feb. 1 as manager of the Secondary Products Sales Dept. **Alexander F. Shearer** was made assistant general manager, Sales Div.

R. J. Steffens was made manager-data processing in the headquarters office (Cleveland) of **American Steel & Wire Div.**, U. S. Steel Corp.

James Oakley, director of manufacturing, was elected vice president-manufacturing, a new post at **Clayton Mark & Co.**, Evanston, Ill. **Walter N. Matthias**, controller, was named treasurer and controller. **James Zamrazil**, industrial relations manager, was named vice president-industrial relations, also a new post.

Herbert O. Johnson was appointed general manager, **Yuba Mfg. Div.**, Benicia, Calif., Yuba Consolidated Industries Inc.

Effective Apr. 1, **Lucius H. Bassett** will become plant manager at the Los Angeles Div. of **Anaconda American Brass Co.** He is presently plant manager at the Torrington, Conn., Div. He succeeds **Warren J. Robinson**, who retires in April.

Robert O. Boden was named plant manager for **Electric Autolite Co.'s** new manufacturing facility at Decatur, Ala. He was general manager of Heltzel Steel Form & Iron Co., Warren, Ohio.

Robert H. LeSage was made assistant product sales manager, Pop Rivet Div., **United Shoe Machinery Corp.**, Shelton, Conn. He succeeds **Jack H. Schofield**, now product sales manager.

Edward L. Ladd, who became president of **Brooks & Perkins Inc.**, Detroit, in September, has resigned. **E. Howard Perkins** continues as chairman and chief executive officer.

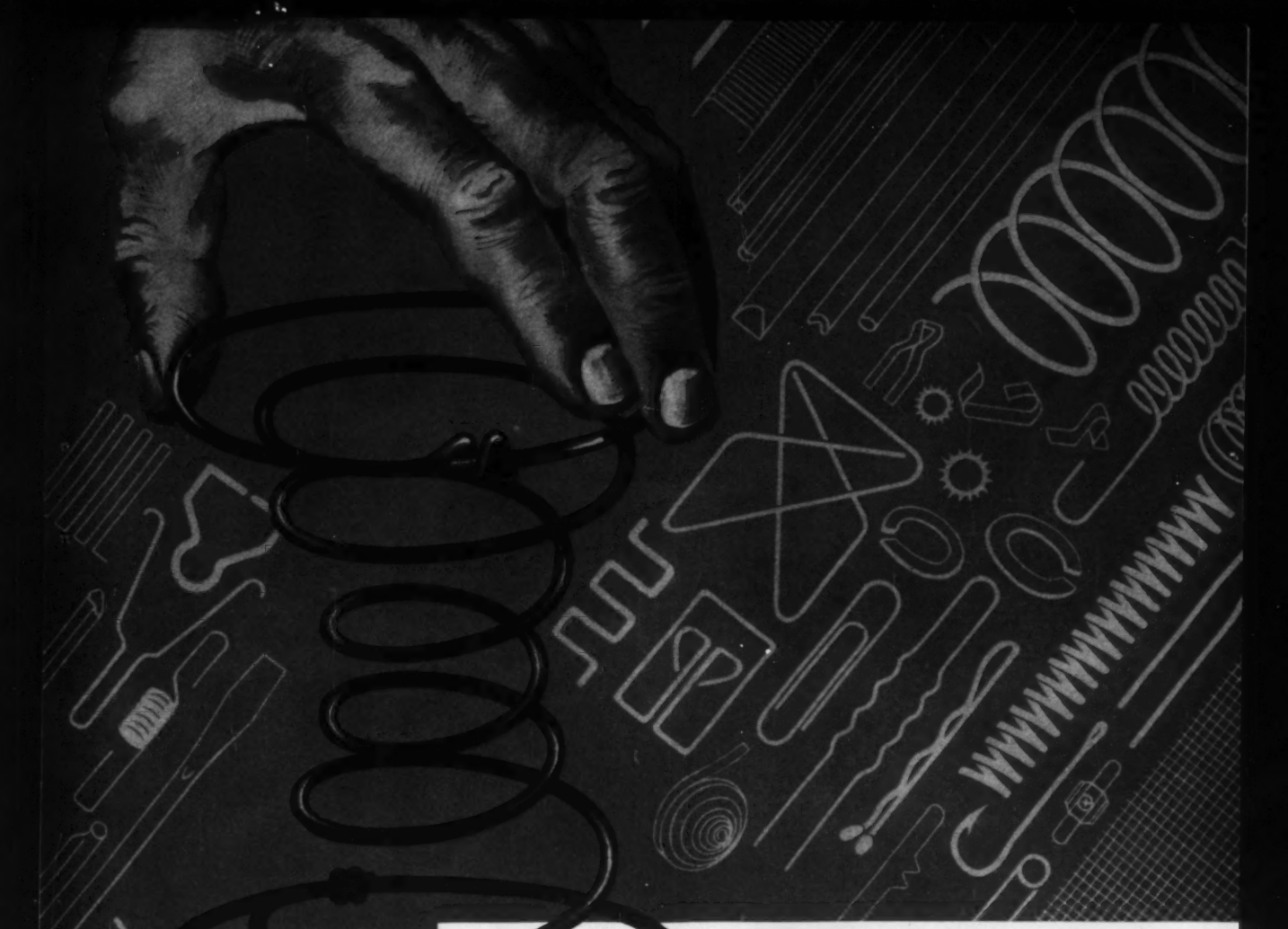
OBITUARIES...

Edward Block, 58, senior vice president and general manager of the Chemical Div. of **Olin Mathieson Chemical Corp.**, died Jan. 4 in Baltimore.

Herbert B. Fox, who retired in June as director of purchases, **E. F. Houghton & Co.**, Philadelphia, died Dec. 28.

Edward A. Crocker, sales manager, Forgings Div., **Billings & Spencer Co.**, Hartford, Conn., died recently.

James W. Tiscornia, president, general manager, and cofounder of **Auto Specialties Mfg. Co.**, St. Joseph, Mich., died recently.



LET'S TALK WIRE!

This spring is typical of hundreds of types and sizes of springs made from PAGE wire—and springs are just one of the many end products for which PAGE manufacturers wire is a logical choice.

Regardless of your use of wire, you can count on PAGE uniformity. Whether you make hairpins or lock washers, PAGE wire will give you the tensile strength, ductility, finish, tolerance and other properties you require.

PAGE facilities are designed to produce a wide range of high quality manufacturers wire items—including special shapes. Where requirements are exacting, you will find PAGE wire unexcelled.

Since 1902, we have pioneered many "firsts" in the wire industry. The latest of these is corrosion-resistant ACCO Aluminized Wire—commercially pure aluminum bonded to a steel core.

Why not put PAGE experience and knowledge to work for you to improve your product and lower your costs.

Let's get together and talk wire!

ACCO

PAGE MANUFACTURERS WIRE

Page Steel and Wire Division • American Chain & Cable Company, Inc.

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

PAGE *-the source for answers to wire problems*

Plant Reliability Reduces Reserve Capacity Needs

GREATER RELIABILITY via better instrumentation and control systems is having a double impact on such industries as steel, power generation, chemical and petroleum processing, and papermaking:

1. There's a trend toward less reserve capacity, as a percentage of total capacity, in those industries.

2. The growth rate of new plant facilities is slower than the growth rate of total installed capacity.

"The net result is that fewer plants will be built although each processing unit is larger in capacity," points out William Crawford, president of Edward Valves Inc. and Republic Flow Meters Co., both subsidiaries of Rockwell Mfg. Co., Pittsburgh. "Many firms are already setting records for productive capacity per unit."

The trends, says Mr. Crawford, indicate that the 1961 market for many capital goods producers will show only a modest increase—and that will come late in the year. It also means that fewer projects are being developed and authorized annually, intensifying the competition for available orders.

Additional impact: Selling prices for many capital goods are stable or declining, despite increased wage and material costs. The long term effect of such a profit squeeze is that less money is available for research and development of new products and processes. That hurts the U. S. position in world markets and reduces our domestic industry growth rate.

Beryllium Plant Enlarged

Wyman-Gordon Co., Worcester, Mass., is completing a $3 million expansion of beryllium facilities and is transferring precision forging equipment from the Prex Div. plant at Franklin Park, Ill. Beryllium processing space at the North Grafton-USAF plant will be increased from 4000 to 16,000 sq ft. Vertical boring machines, lathes with tracer controls, test turning lathes, and auxiliary equipment are being installed. Prex equipment being moved includes two presses (6000 and 3000 tons). They will supplement the 50,000, 35,000, and 18,000 ton closed die, forging presses used on large components. The smaller presses are required for the precision work on small components made of beryllium and other metals.

Missile Div. Renamed

North American Aviation Inc., Los Angeles, changed the name of its Missile Div. (Downey, Calif.) to Space & Information Systems Div. Harrison Storms, vice president, will head the organization at Downey.

Will Build Helium Plant

Air Products Inc., Allentown, Pa., is designing and engineering a helium extraction plant for Kerr-McGee Oil Industries, Oklahoma City, Okla. Air Products will also provide all the low temperature equipment for the facility—it'll be erected in the Pinta Field, Apache County, Arizona. Daily capacity will be 2.5 million cu ft of gas (containing about 8 per cent helium). Purity of the product will be 99.995 per cent.

Hyster Co. Expanding

Hyster Co., Portland, Oreg., is enlarging its manufacturing and office facilities at Danville, Ill. Cost, including furnishings and plant equipment: About $1.7 million. The firm recently completed erection of new quarters for its retail branch in South San Francisco, Calif., and a $600,000 general administrative office building in Portland.

English Firm Acquired

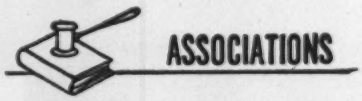
Leeds & Northrup Co., Philadelphia, has acquired all outstanding shares it had not previously owned of Integra, Leeds & Northrup Ltd., Birmingham, England. The subsidiary has been renamed Leeds & Northrup Ltd. A substantial investment will be made to improve plant and facilities. I. Melville Stein, president of the parent firm, becomes chairman of the Birmingham subsidiary. J. M. Jackson has been appointed vice president and general manager of Leeds & Northrup, Canada.

Foundry Adding Furnaces

Gibson & Kirk Co., Baltimore, is installing a 175 kw, high frequency, induction melting furnace in its foundry. During the first half of this year, two additional electric furnaces of similar capacity will be installed. The firm produces brass, bronze, and aluminum castings. E. W. Horlebein is president.

Square D Acquires Plant

Square D Co., Detroit, purchased (from Gorham Mfg. Co.) a 98,000 sq ft plant at Asheville, N. C., to serve as headquarters for its Commercial Control Div. The company makes electrical distribution and control equipment.



Industrial Truck Association, Pittsburgh, re-elected these officers: President, P. S. Hill, Hyster Co., Portland, Oreg.; vice president, R. L. Wolter, Automatic Transportation Co., Chicago; executive secretary-treasurer, L. West Shea, Hanson & Shea Inc., Pittsburgh.

Benjamin J. Imburgia has joined the staff of the **Gray Iron Founders' Society Inc.,** Cleveland, as field secretary.

Spring Manufacturers' Association of the United States, Bristol, Conn., elected these officers: President, G. D. Jacobson, Newcomb Spring Corp., Valley Stream, N. Y.; vice president, Al Bonde, Accurate Spring Corp., Chicago.

Resistance Welder Manufacturers' Association, Philadelphia, elected these officers: President, Simon Fisher, National Electric Welding Machines Co., Bay City, Mich.; and vice president, H. V. Beronius, Swift Ohio Corp., Kenton, Ohio.

Electric Overhead Crane Institute Inc., Washington, elected these officers: President, W. W. Peattie, Northern Engineering Works, Detroit; vice president, H. W. Gledhill Jr., Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y. Joe H. Peritz was re-elected executive secretary and treasurer; C. M. Dinkins, general counsel.

Steel producers are being invited to join frit and plumbing fixture manufacturers to form an industry-wide association, **Porcelain on Steel Council.** It will operate as an independent group affiliated with the **Plumbing Fixture Manufacturers Association,** Washington.

Charles H. Weaver, Westinghouse Electric Corp., Pittsburgh, has been elected president of the **Atomic Industrial Forum Inc.**, New York.

Purchasing Agents Association of Chicago elected Harold A. Berry of the Chicago, Rock Island & Pacific Railroad, president for the balance of the 1961 term.

Claire G. Ely, Maytag Co., was elected chairman of the American Home Laundry Manufacturers' Association, Chicago; Fred H. Holt, General Electric Co., vice chairman; and Mason Smith, Whirlpool Corp., treasurer. Guenther Baumgart continues as president and chief executive officer.

NEW ADDRESSES

Jones & Lamson Machine Co., Springfield, Vt., transferred the operations of its Boston district office to 442 Marrett Rd., Lexington, Mass. J. N. Hinchliffe is district manager.

Sintercast Div., Chromalloy Corp., moved into a 43,000 sq ft plant at 171 Western Highway, West Nyack, N. Y.

Unigage Corp. moved to a larger factory at 330 Interstate Rd., Addison, Ill. The firm makes precision gaging equipment.

American Nickeloid Co., Peru, Ill., moved its Chicago sales office to 6037 N. Cicero Ave., that city.

NEW OFFICES

Industrial & Machine Tool Dept., Radio Corp. of America, New York, opened new sales offices at Dayton, Ohio; Kalamazoo, Mich.; and Doylestown, Pa.

Armco Div., Armco Steel Corp., Middletown, Ohio, opened a sales office in the Oil & Gas Bldg., New Orleans, La. A. E. Chugden is sales representative under the direction of C. L. Coleman, Houston district manager.

Wellman Bronze & Aluminum Co., Cleveland, established district sales offices at 967 Farmington Ave., Hartford, Conn., under the direction of A. K. Stevens; and at Cow Path Road, M. R. No. 1, Lansdale, Pa., under the direction of W. F. Trakat Jr., Eastern regional sales manager.

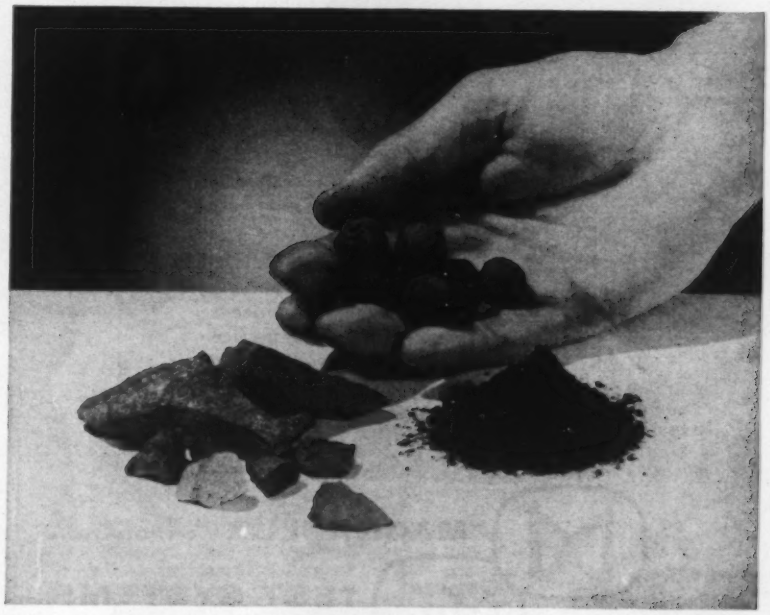
Simonds Saw & Steel Co., Fitchburg, Mass., opened a Southern California branch warehouse, sales office, and service shop at 1950 E. 20th St., Los Angeles, Calif. The branch will function as a combination facility for the parent company and its subsidiaries, Simonds Abrasive Co. and Heller Tool Co. John L. Mershon is Southwest manager.

NEW PLANTS

Wire Rope Div., Jones & Laughlin Steel Corp., Pittsburgh, opened its new service center at 3434 S. 53rd Ave., Chicago 50, Ill. D. D. Hyland, area sales manager-Midwest territory, is supervising the service center.

Baltimore Concrete Plant Corp., Baltimore, plans to construct a 15,554 sq ft plant in Anne Arundel County, Maryland. The new facility will turn out prestressed concrete floor panels.

A. O. Smith International S. A., a subsidiary of A. O. Smith Corp., Milwaukee, will build a 14,000 sq ft manufacturing plant at Stratford, Ont. It will produce initially commercial water heaters; other Smith products will be made as business develops.



Source: Link-Belt Co.

THREE STAGES IN TACONITE ORE PROCESSING at Youngstown Sheet & Tube Co. are shown: Lumps of raw ore are crushed to minus 100 mesh, processed to lift the iron content from 30 to 64 per cent, then agglomerated and baked into pellets, about 3/4 in. in diameter. The pellets are used for blast furnace feed. One ton of pellets requires about 3 tons of raw ore

BECAUSE YOUR TEST NEEDS ARE DIFFERENT!

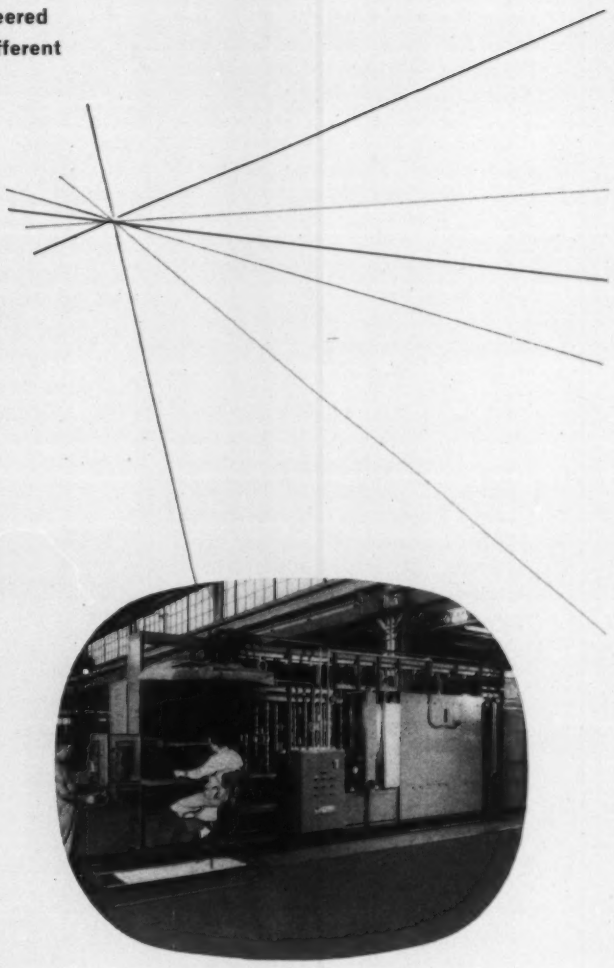
...from MAGNAFLUX you can find many engineered nondestructive test systems*, to meet widely different needs...as near as your telephone.

Only the widest *range* of test systems can assure you of getting the one *best* answer to your own "different" test problem. Several examples of the many ⋈ tests are shown at work on the next page.

The intensive problem-knowledge of the Magnaflux Field Engineer goes to work for you immediately. He qualifies as an impartial, expert counsel because he has thorough training in practically all wide-used nondestructive test systems. (Actually, we offer scores of systems, methods, test services, instruments and custom-engineered units. Magnaflux originated most of 'em and has been improving them ever since.)

Further, he wires you into more nondestructive testing know-how than you're likely to find anywhere else. He's backed, for instance by many hundreds of man-years of experience in field application and of design and project engineering. *Plus* a big department-full of far-reaching research. *Plus* the up to the minute knowledge gained in operating our own fifteen Commercial Testing Centers in principal cities, where the "unusual" tests occur almost daily to meet hundreds of differing needs and specifications.

At Magnaflux you find maximum nondestructive testing assistance—in equipment, men and experience-based understanding of your needs and problems. May we put it all at your service—SOON? Phone your local Magnaflux Field Engineer, or write us. Magnaflux Corporation, 7312 W. Lawrence Avenue, Chicago 31, Illinois.



TESTING BEARING CAGES with ZYGLO fluorescent penetrant. This Zyglo ZA-49, equipped with an endless conveyor, provides mechanized, high volume testing of nonmagnetic parts from ¾" to 10" in diameter. All processing is fully automatic, assuring predetermined control and repeatability of results.

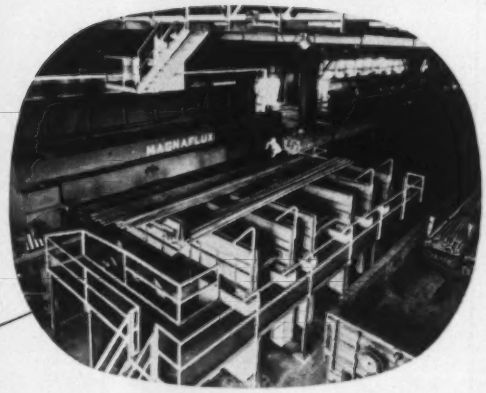
⋈ **MAGNAFLUX** CORPORATION

A SUBSIDIARY OF GENERAL MILLS

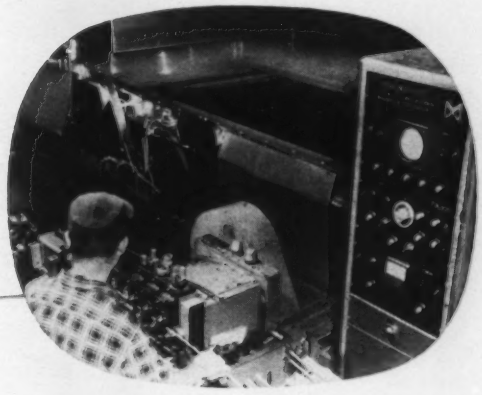
General Mills **TEST SYSTEMS**

*MX test systems include MAGNETIC PARTICLE, FLUORESCENT PENETRANT, THERMOGRAPHIC, EDDY CURRENT, ULTRASONIC, STRESS ANALYSIS, RADIOGRAPHIC TESTING, DYE PENETRANT & MAGNETIC FIELD

A Few of Thousands of ⋈ Test Installations at Work—Could One of Them Help You?

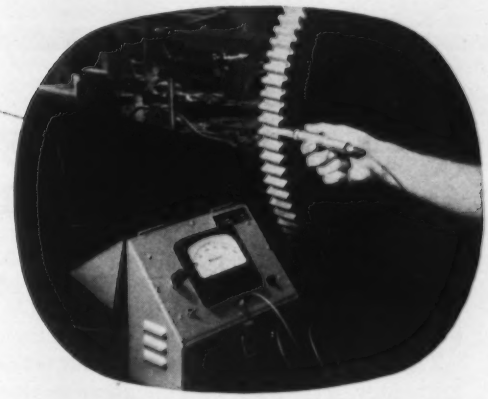


BILLET CONDITIONING SYSTEM
Mechanized, ⋈ engineered inspection and handling provides more control, better quality level, and lower costs from conditioning. MAGNAGLO, electronic eddy current, ZYGLO fluorescent penetrant testing, for billets, tube rounds, welded and seamless tubing and pipe.



TESTING COPPER TUBING ELECTRONICALLY
with MAGNATEST FW-400, for cracks and seams at production speeds. Many kinds of MAGNATEST instruments, hundreds of applications: determining metal properties, defects, characteristics, sorting, etc.

TESTING THICKNESS ULTRASONICALLY
for core shift of castings, or almost any solid material, from .025" to 3.00", for thickness, corrosion, etc., from one side only. Portable transistorized SONIZON SO-300 gives instant dial readings, accurate to ±1%. Magnaflux Field Engineer instructs in operation (above).



TESTING JET ENGINE
turbine wheels electronically for serration cracks, with MAGNATEST ED-500G, eddy current instrument. Magnatest units measure relative depth of cracks, electrical conductivity, evaluate metals for all sorts of basic or process-built characteristics.

RADIOGRAPHIC TESTING
of boiler tubes with gamma radiation isotope. X-ray and gamma radiography service available at several locations. Performed by certified technicians and engineers at your plant or at your local ⋈ Commercial Testing Center.

©1960, Magnaflux Corporation

MAGNAFLUX, MAGNAGLO, ZYGLO, ZYGLO-PENTREX, BONDCHECK, MAGNATEST, SONIZON, STRESSCOAT AND SPOTCHECK ARE U.S. REGISTERED TRADEMARKS OF MAGNAFLUX CORPORATION

M&T produces a vinyl plastisol so tough it's used as a dishwasher lining

AMONG the tough jobs for which M&T vinyl plastisols are suited, one of the toughest is that of a dishwasher lining.

Consider the service conditions: scalding hot water, mixed with highly alkaline cleaners which are death on ordinary coatings, is hurled with high velocity against the tub. As if this weren't enough, the lining has to be resistant to food stains, avoid cutting and impact damage from accidentally dropped or broken objects. Equally important, it should be non-aging, last the life of the machine.

A Unichrome* Plastisol Compound satisfies all these rigorous conditions . . . and more. Sprayed in substantial film thickness, it helps muffle the drumming of water on tub. It comes in colors that attract the buyer. It sticks tight to the tub. Torture-tested for periods equivalent to many years' service, it showed no loss of bond, no blistering or breakdown.

Unichrome Plastisols apply by usual production methods. They're also being used to multiply the wear-resistance of agitators and impellers . . . to corrosion-proof a chemical carrying tank car . . . and on a host of other industrial and consumer products. Learn what Unichrome Plastisols have to offer *you*. Send for bulletin VP-4 or for an M&T Man.

*M&T's registered trademark

M&T **coatings** · chemicals · metals
plating products · welding products

METAL & THERMIT CORPORATION, General Offices: Rahway, New Jersey

Technical Outlook

DOUBLE OR NOTHING—The Russians say they are building a six furnace open hearth shop which can produce 3.5 million tons a year. It will feature four units with capacities of 935 to 1045 tons. A 25 per cent improvement in labor efficiency (compared with performance on 500 ton units) is expected.

ORE FROM ROCKS—Future world mineral requirements will become so great that all known deposits will be depleted. What then? We will extract minerals from ordinary rocks, predicts Harrison Brown, California Institute of Technology, Pasadena, Calif.

WORK ON ALUMINA COATINGS—Flame spraying alumina on metal surfaces was recently researched by the National Bureau of Standards, Washington. Some conclusions: 2 in. from a powder gun, alumina particles are molten on the outside; at 4 in., all droplets are molten; at 6 in., only their cores are molten. Bonds between alumina and glass are largely chemical; those between it and metal are principally mechanical.

IMPROVED COKING FURNACES—Steelmaking facilities being built in Brazil by a French firm will feature 62 coke ovens with doors which may be unbolted and raised simultaneously by the door puller. They will also have reversing boxes to cut losses. Other facilities planned include coal chemical recovery units.

FLOORS FOR PEDALS—Movable automobile floorboards may replace conventional brake and accelerator pedals, thinks Bendix Corp., New York. The proposed unit is in two pieces: The floorboard on the driver's left would require a 1/8 in. movement to actuate power brakes; the accelerator side would move only 1 1/8 in. maximum. The goal: More safety.

B-58 TRANSPORT—A Convair propulsion engineer, R. J. Patton, proposes the B-58 as the quickest route to a supersonic transport by 1965. He foresees a 52 passenger version capable of a Mach 2.4 cruising speed. The National Aeronautics & Space Administration has scheduled simulated commercial flights in a B-58 this year, he claims.

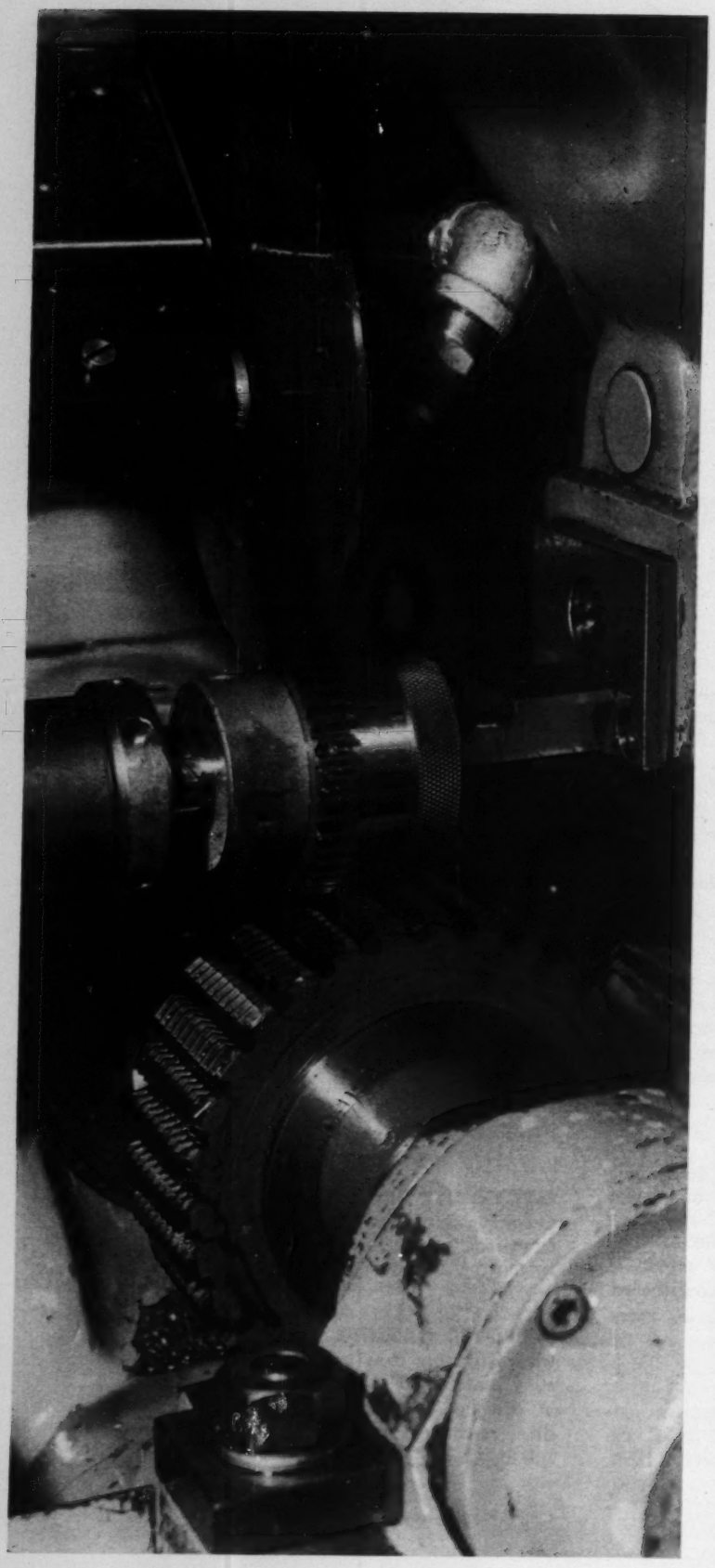
TITANIUM GAINS—Here are several reasons why titanium sales exceeded expectations in 1960. The metal is being used in the nose cowl, tail pipe, and struts of the Convair 880, Boeing 707, and B-52; in Minuteman missile engine cases; in lightweight ordnance (such as the Davy Crockett close range nuclear weapon); and marine hardware, states Crucible Steel Co. of America, Pittsburgh.

JOINS THIN PARTS—To assemble a thin walled expansion bellows to a stainless exhaust assembly for a diesel engine, the Stainless Processing Div., Wall Colmonoy Corp., Detroit, employed a nickel brazing alloy. Joining was done in a hydrogen atmosphere at 1900° F. The technique avoids the problem of burnthrough encountered in welding extremely thin stock.

WATER CONSERVATION—A blanket of waxlike solids (cetyl and stearyl alcohols) spread over large areas of water (they check evaporation) may help solve severe shortages in the U. S. by 1980, predicts Dr. V. K. La Mer, Columbia University, New York. Experiments in Australia and water short areas in the West have proved that evaporation can be reduced 50 per cent. The technique does not interfere with normal uses.

ELECTRICITY FROM GASES—Scientists at Columbia University, New York, are taking a close look at the direct production of electricity by moving high temperature gases called plasmas.

IMPROVED CASTING ALLOY—A Detroit centrifugal casting firm is testing a new aluminum alloy that is said to be comparable to Grade 380 in cost but has greatly increased ductility and shock resistance. Sample bars can be bent to a 70-110 degree angle.



New Hobbers Help Lift Gear Quality

. . . large hobs, hard blanks

NATIONAL CASH REGISTER CO. achieved a substantial improvement in the quality of gears for its business machines via eight, Barber-Colman Multicycle hobbing machines at its Dayton, Ohio, plant.

The need for such improvements stems from the fast pace of business machine technology. In this instance, more parts had to be fitted into less space and do more things.

Here are some of the results attributed to the new equipment:

- Gears ½ to 3 in. in diameter are made with runouts under 0.0005 in. The previous equipment and method produced runouts of 0.003 to 0.005 in. (total indicator reading).
- Scrap has been cut from 20 per cent to almost nothing.
- Production equipment now requires less floor space.
- Automatic cycling (a Multicycle feature) is five times faster than comparable hand operated equipment.

In addition, finishing operations (like deburring) have been eliminated. Hydraulic clamping action replaces the former hand tightening of gear blanks in fixtures, increasing accuracy.

Arrow identifies part being inspected

. . . reduce runout six times, cut rejects to almost nothing

• The machine features a large hob which has 3½ times more cutting edges than the former ones. Since the load per tooth is reduced, gear blanks can be hardened before machining.

New hobs are 5 or 6 in. in diameter vs. only 2 in. formerly. Size contributes to greater rigidity and increases machining accuracy. More teeth on the circumference distribute the cutting load and make faster machining possible. NCR has used the machining advantage to cut hardened stock at the same speed as the old hobs handled annealed blanks. Another factor: Larger circumference permits more latitude in choosing a tooth angle for machining harder stock.

"The quality of our gears depends heavily on blank quality," states W. G. Flanagan, supervisor of the firm's machining division. Gears were formerly blanked on a punch press, then staked to a hub which was permanently fastened with a copper braze. After hobbing, gears were heat treated. Scrap often ran 15 to 20 per cent due to warping or excessive runout.

New blanks are machined from solid bar stock. Holes are first bored, then the outside diameter is turned, the ends faced and cut off. After heat treatment to Rc 47, the hole is ground and the ends squared with the hole. Such blanks are hobbed and sent directly to inspection and assembly. No deburring is required.

• A fivefold improvement was realized in the production of transmission drive segments.

"Ordinarily," says Mr. Flanagan, "a large inside gear diameter permits us to use a large, rigid arbor and increase the number of pieces machined at one time."

The transmission gear has an inside diameter of 2 in. Improved setup enables operators to load 90 pieces on one arbor compared with 30 pieces on the old one. The larger, 6 in. hob cuts 0.45 in. per revolution; the old one could handle only 0.015 in.

"The larger hob also gives improved machining characteristics," says Mr. Flanagan. "The only limiting factor we have is loading and unloading the interchangeable arbors. The large hob could machine the blanks even faster if we could surmount that barrier," claims Mr. Flanagan. All 90 pieces are held within the 0.0005 in. runout limits.

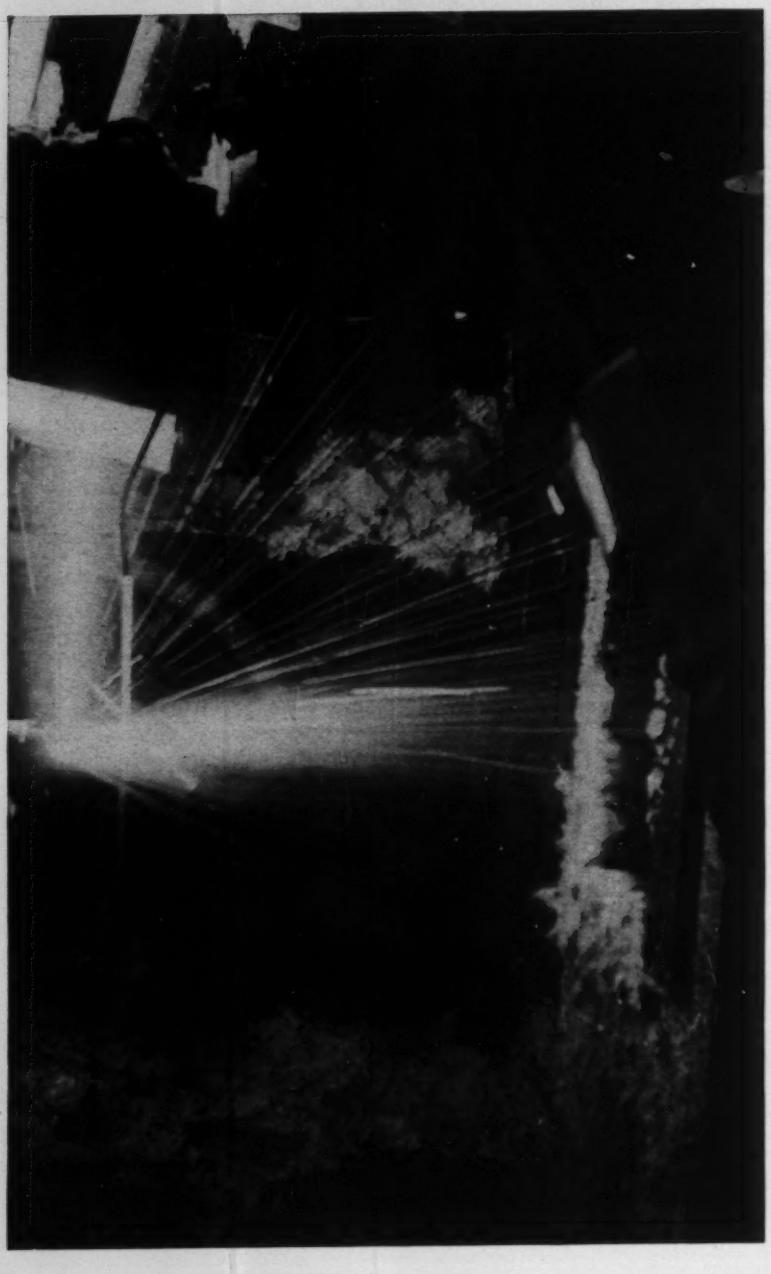
• The need for the improvements was brought about by redesign of National Cash Register's Class 31 machines and production of entirely new Class 33 accounting machines. Tolerances were tightened drastically to conserve space and meet more exacting performance standards.

"As soon as the first pilot models were completed, our chief design engineer showed us why we would have to drastically upgrade our production performance," recalls Mr. Flanagan. "New models perform many more functions in a smaller space. Inaccurate parts mean inaccurate operation."

Production people at NCR are convinced the improvement wouldn't have been possible without the new machinery. A side benefit: The automatic features have enabled time study people to establish more exact cost controls on parts produced.

Ceramic Fibers Get Hot Jobs

Molten alumina-silica spray hits a booming market with a fourfold demand increase by 1965 forecast. Other refractory fibers will share in upturn. Thermal and chemical resistance are their strong points



HORIZONS FOR ceramic refractory fibers are widening in industrial and space applications.

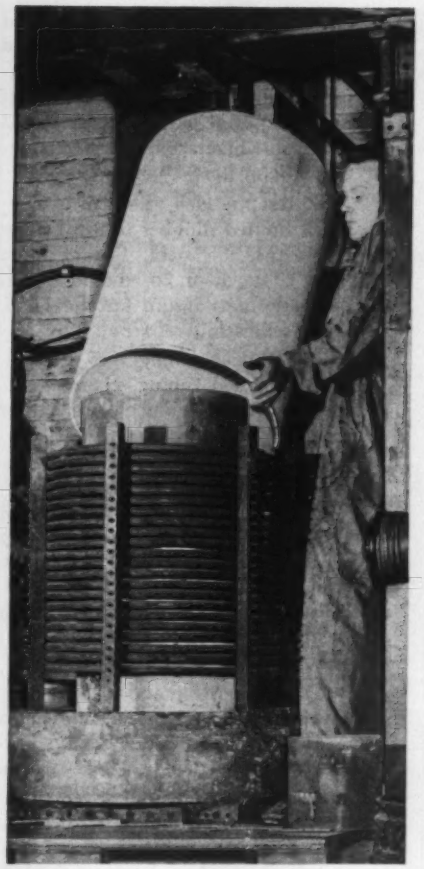
C. F. Robinson, president of Carborundum Co., Niagara Falls, N. Y., says that the primary metals market will make up most of the expected sales gain for the company's Fiberfrax in the next five years.

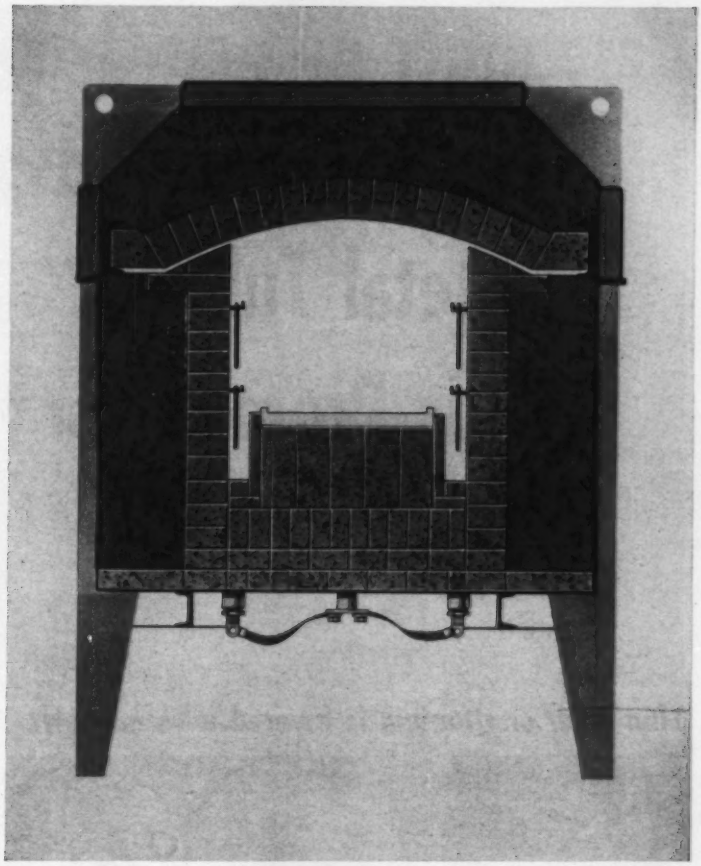
In space capsules such as project Mercury, the material efficiently handles high temperature insulation jobs and is also serving as a reinforcing agent in Teflon.

The fiber is available in forms such as blankets, blocks, boards, cloth, and papers.

• **A big advantage in working with ceramic fiber insulation is its lightness and low heat capacity.**

One maker claims its product weighs as little as 1/40 of an equal volume of hard firebrick. Insulation is quicker with reduced labor and handling cost.





Two uses: Induction furnace liners and furnace insulation

An experimental furnace lined with fiber packed to a 12 lb per cubic foot density took only 2¾ hours to reach equilibrium temperature. An identical furnace lined with insulating firebrick required 6-1/3 hours.

• Many liquids or gases can be filtered in corrosive atmospheres and at elevated temperatures.

Such filters have the advantage of being easily cleaned by burning or baking out the filtered residue. Predicted applications include filtering molten metals, hot oils, tars, and superheated air and gases.

Babcock & Wilcox Co., New York, says some of the unique applications for its Kaowool include gas turbine and gas turbine muffler insulation.

Johns-Manville Corp., New York, cites an insulation application of its Cerafelt fiber in which 100 ton ingots are maintained at 1700° F during a ½ mile trip between the pouring plant and the forging plant.

• Fiber rope is being used in the vacuum stream-degassing of steel.

Carborundum says it's applied to maintain a positive seal between the hot top and the ingot mold. F. J. Stokes Corp., Philadelphia, also recommends it in any location in a vacuum tank where a seal is exposed to molten metal or high temperatures (such as between the ingot mold and stool area).

• Fiber base paper (about 80 mils) is accelerating the honeycomb brazing cycle and helps distribute heat uniformly throughout the work.

For heat control, the material has been substituted for the top graphite structure. It's estimated that the 80 mil thickness is about equal to a 1 in. thickness of graphite in heat balance characteristics.

• Fiber materials include alumina, alumina-silica combinations, zirconia, beryllia, thoria, iron oxide, silica, chromium, and potassium titanate.

One fiber developer (Horizons Inc., Cleveland) says: "We could convert almost any oxide to fibers . . . Until now we have been primarily interested in materials with heat resistance and maximum strength."

Du Pont's Tipersul is a fiberous potassium titanate. It's successful at blocking heat penetration because of its exceptional ability to diffuse and reflect infrared radiation, says Du Pont.

Work with ceramic fibers at National Beryllia Corp. is reported to be in laboratory stages. Philip S. Hessinger, manager of research and development, says his firm has limited research to beryllia.

Norton Co. is also doing work in the ceramic field.

High temperature strength of metals can be boosted by using single crystal alumina fibers in a matrix, says GE's Metallurgy & Ceramics Research Dept., Schenectady, N. Y.

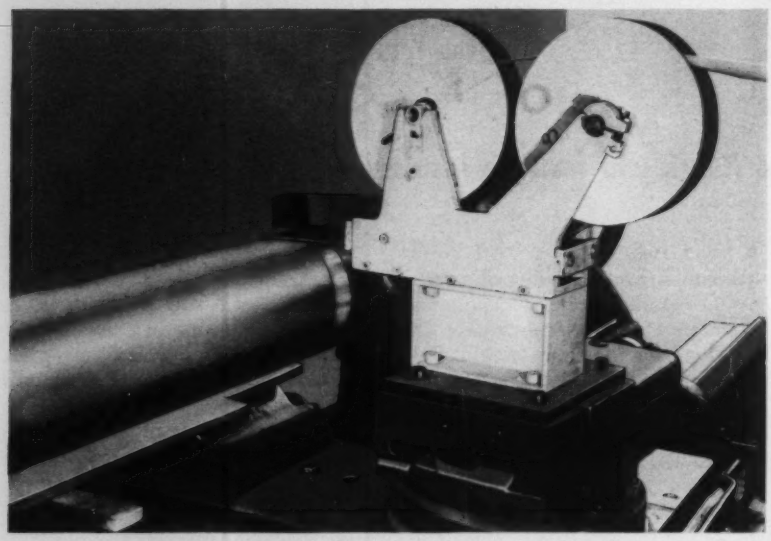
Adhesive Bonded Metal Tubing Holds Promise for Missile Bodies

PAPER THIN STRIPS of steel and titanium wound into tubes and glued may be the answer to improved high strength engine cases for solid propellent missiles, thinks Ingersoll-Kalamazoo Div., Kalamazoo, Mich., Borg-Warner Corp.

To test the idea, the firm is making a limited number of 8 in. tubes from AM 355 steel; several more from 20 to 40 in. in diameter will be made of titanium for the U. S. Army's Picatinny Arsenal.

Principal advantages of the adhesive bonded tubing, claims L. E. Hershey, chief engineer, are lighter weight, greater dimensional accuracy, higher strength to weight ratio than tubes made by more conventional methods. "The process is cheap because it doesn't require any special finishing or heat treatment. And adhesives for this type of application are less expensive than welding or brazing," he says.

Thin steel or titanium is layered with adhesive . . .



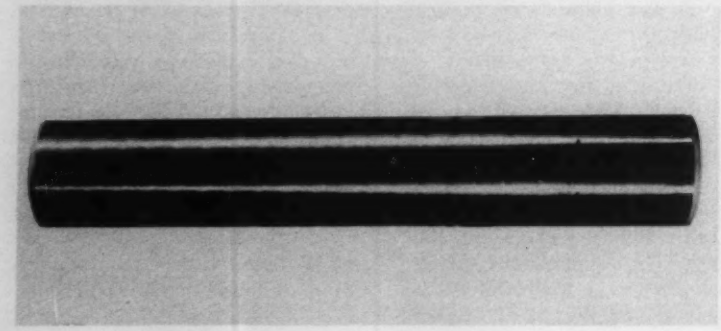
• Five layers of metal separated by layers of adhesive are wound on a cylindrical mandrel. Wall thickness of 0.037 in. is held within 0.005 in.

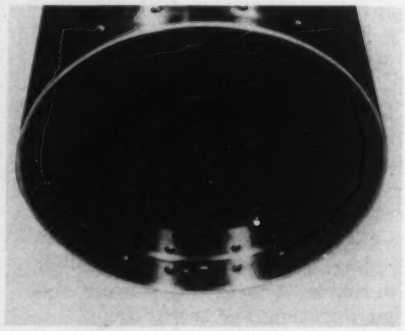
After cleaning, metal strip is put in a tensioning fixture and fed onto a Teflon coated, aluminum mandrel. Helix angle is held between 9 and 10 degrees, depending on strip width.

Mr. Hershey points out that rate and angle of feed must be carefully controlled to avoid gaps or overlaps in the spiral windings. Gaps between helixes are held at 0.010 in. and fine adjustments in the helix angle are made during winding of subsequent layers.

After the first metal layer is done, the coil is cut off and a layer of adhesive is wound on. Alternate layers of metal and adhesive are

. . . producing this missile case with machined end rings





laid up until the desired strength level is reached. The Picatinny Arsenal project requires five metal layers for 8 in. tubes.

A final layer of adhesive film is wrapped around the ends of the tube and machined steel ends rings (SAE 4140) slipped on. Rings are ground to a 4 or 5 microinch finish on the inside diameter to insure maximum bonding.

• Following curing in a conventional furnace, tubes are inspected for flaws.

Both mandrel and tube are put in a gas fired furnace for 75 minutes to cure the adhesive at 300° F. Teflon coating on the mandrel also acts as a parting agent to permit removing the tube by hand. Expansion differential between the aluminum mandrel and the steel or titanium tube provides the internal pressure to insure a good bond.

After cooling, excess end stock is trimmed from the tubes.

Tubes are visually checked for flaws and the dimensions measured. Reproducibility is said to be within 5 per cent. Under hydrostatic testing, steel tubes are able to withstand 260,000 psi. Composite density is 0.208 lb per cubic inch.

• Ingersoll has experimented with several types of steel and adhesives.

The firm decided that AM 355 steel strip, cold reduced, tempered, and aged gave best results. Strip is 4 in. wide, 0.005 in. thick, with a tolerance of plus or minus 0.0004 in.

The adhesive (AF 15, a nitrile-phenolic resin) has enough elasticity to provide a complete 0.003 in. coating between layers. Lap shear strength is most critical—normal range is 3000 to 3500 psi although tests have been made at 10,000 psi, the firm reports. Objective: Adhesives which will retain those strengths at higher temperatures.

• Ingersoll believes that commercial production is feasible with less expensive materials.

For the time being, the firm will concentrate on its defense contract, but it will keep the way open for pipe manufacturing for liquid or gas transmission lines. The commercial version will be called Heli-Lap.

Self-Dumping Hoppers Speed Scrap Handling

These two men illustrate how . . .

SELF-DUMPING hoppers have cut scrap metal handling costs 50 per cent at the Hopewell Div., Hopewell, N. J., Rockwell Mfg. Co.

Such containers are also said to be safer to handle than 55 gallon oil drums formerly used.

• The Roura hoppers enable two men to do the same amount of work as four working with drums.

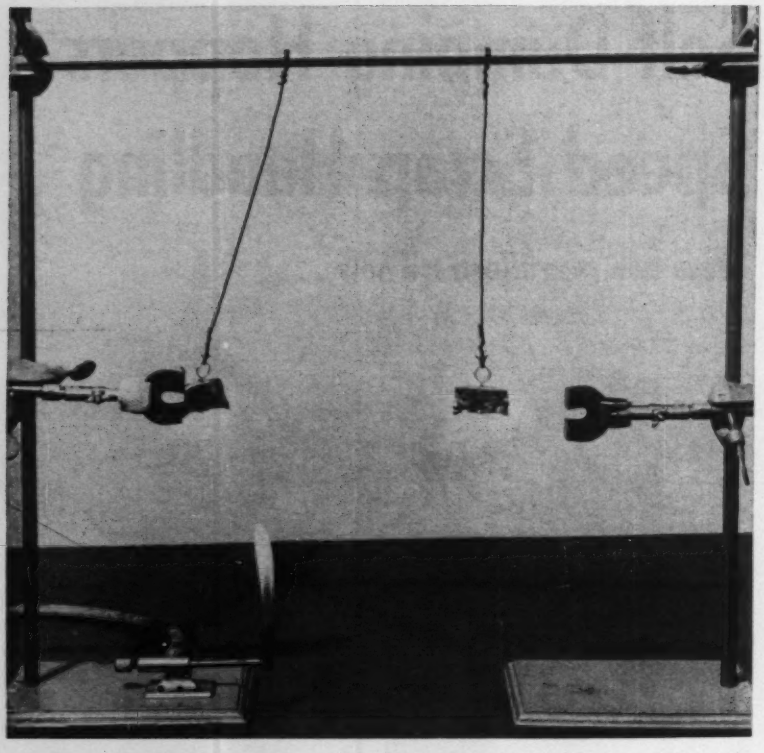
Each hopper holds ¾ cu yd. (About the same amount of scrap required three or four 55 gallon drums.) A fork lift operator can deliver a day's accumulation of steel scrap in two trips. It formerly took eight.

In the yard, the fork truck lifts a hopper over the side of a truck body. When a release handle on the rear of the hopper is tripped, the hopper automatically dumps its load, rocks back, and locks in an upright position, ready for the next trip. The cycle is much faster than manual handling and is much safer.

Such hoppers are also designed for fork truck handling.

• Service cocks, liquid meters, meter registers, and machined meter components are produced by the plant, generating steel and brass scrap. Both are handled separately.

Brass scrap is held until a truck load is accumulated. When it was kept in the 55 gallon drums, the dented, bent, or out of round shapes made stacking difficult and unsafe.



Magnet pulls heated sample, showing that . . .

Compound Is Magnetic When It Is Heated

HEAT makes a new series of metal compounds magnetic; they become nonmagnetic again on cooling. (Most materials lose their magnetism when they are heated.) The series (antimony is combined with variable proportions of chromium and manganese) was discovered by researchers at E. I. du Pont de Nemours & Co., Wilmington, Del.

This application will give you an idea of potential: In the laboratory, heat was converted into motion without the use of electricity (see photo above). The property can be used to turn a wheel. The rim is made of a compound with a transition temperature a little above room temperature. (Transition temperature can be controlled by relative proportions of chromium and manganese.) A heat source and a magnet are placed near the rim. As the heated area becomes magnetic, it is pulled toward the magnet where it cools and loses its magnetism. At the same time, the next area is being heated.

• Iron and other magnetic materials usually have a temperature below which they become, and stay, magnetic.

In steels, for example, the point at which the metal loses its magnetism is close to that from which it should be quenched for hardening—a property which has been used by heat treaters. The operator determines the point at which magnetism disappears; above that the steel is austenitic.

At any temperature below the point of change—the Curie point—iron and steel are magnetic. And that is also true of other magnetic materials.

• The new compounds have a magnetic peak.

At some temperature, which is determined by the analysis of the compound, the magnetic properties of the new materials are at a maximum. As temperature drops, the magnetic characteristics disappear. And above the peak temperature, the properties fall off.

The discovery of the chromium, manganese, antimony compound resulted from fundamental studies into the properties of manganese compounds. (They were chosen for study because of their interesting magnetic properties. Changes in magnetic properties are being investigated to provide clues to the basic structure of matter.)

• Called chromium manganese antimonide, the compound's properties vary with composition.

Manganese antimonide—a similar compound of manganese and antimony—has normal ferromagnetic properties. But the addition of chromium, which replaces a portion of the manganese, develops the reverse characteristics.

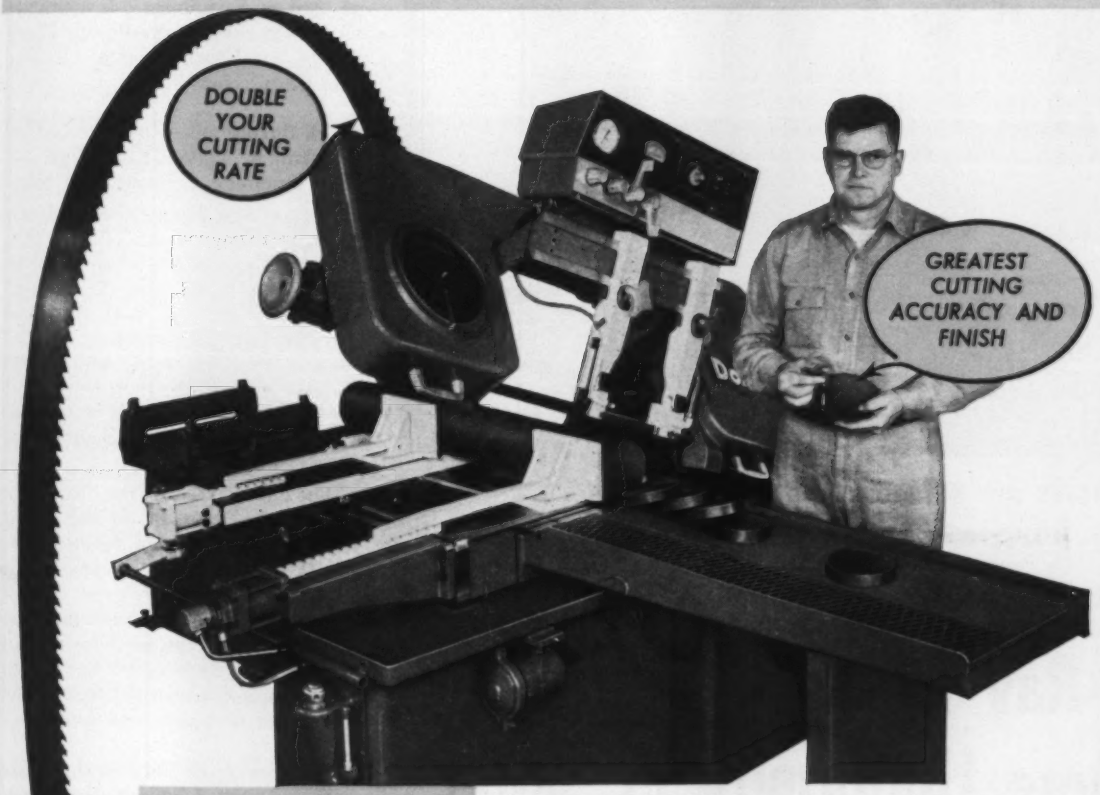
Adjustment of the chromium content will permit setting the transition temperature from near absolute zero to over the boiling point of water, Du Pont reports. By comparison, most magnetic substances have their maximum magnetization near absolute zero.

• Above the temperature of maximum magnetization, the compounds behave like conventional ferromagnetic materials.

The magnetization decreases with increasing temperatures, disappearing at the Curie temperature for the particular composition. For a compound whose transition takes place at room temperature, the Curie point is about 480° F.

Discovery of the series was reported by five scientists: Drs. Thomas J. Swoboda, Tom A. Bither, William H. Cloud, Howard S. Jarrett, and Monroe S. Sadler.

NEW DoALL Machine Tool With NEW Tungsten Carbide Blade



New Cut-Off Rates

MATERIAL	SIZE	DoALL TIME
4340	7" dia.	2.9 min.
1018	6-3/16" dia.	1.25 min.
1020	5" dia.	49 sec.
18-8 Stainless	7" sq.	8 min.
Stentor	6" dia.	3.8 min.
1117	3½" dia.	27 sec.
1020	6" dia.	1.2 min.
4340	11½" dia.	8 min.
Ketos	11¾" dia.	8 min.
4140	5¼" dia.	2 min.
8620	10½" dia.	7.5 min.
4150	8" dia.	5 min.

Wait till you see this team cut your stock to lengths. It's terrific! With tremendous cutting ability, DoALL's revolutionary TUNGSTEN CARBIDE Saw Band on an entirely new power saw is the team that wins again. It delivers by far the fastest cutting rates ever achieved by any band tool cut-off saw, together with the remarkable accuracy and finish for which the DoALL Power Saw is famous.

Automatically operated, the machine has the power to drive the TUNGSTEN CARBIDE Band up to 450 fpm. It offers broad feed force range, self-adjusting carbide-faced saw guides, automatic chip conveyor, plus many other features.

For lowest cost, highest cut-off productivity, mail us this coupon . . .

PS-18

This is a typical DoALL Store

ASK FOR A DEMONSTRATION TODAY!

THE DoALL COMPANY, Des Plaines, Illinois

We would like to see a demonstration of the new DoALL C-70 TC Power Saw in our plant—without cost or obligation.

Name_____

Company_____

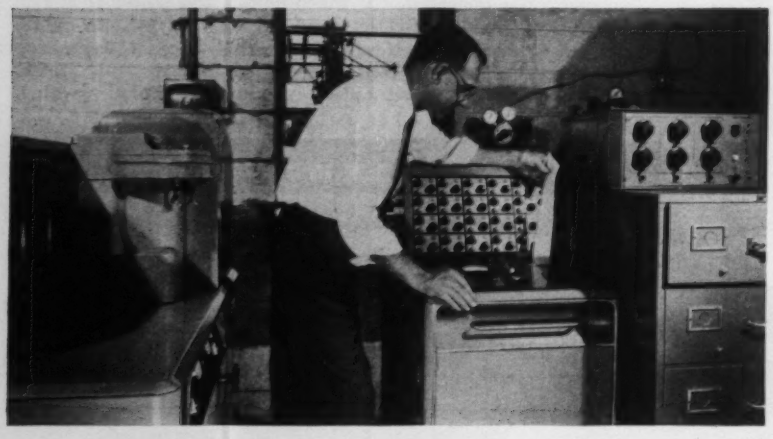
Address_____

City_____ State_____

Samples are pulverized, pelletized, then . . .

X-Ray Instrument Insures More Uniformity in Sinter

. . . Strip chart record is ready in minutes



FASTER ANALYSIS insures closer control of chemical uniformity—in raw materials and finished sinter—at the Saxonburg (Pa.) plant of United States Steel Corp.

Determinations are made in the laboratory with an x-ray instrument called the Norelco Autrometer, in about one-sixteenth the time required by the fastest previous method used at Saxonburg. Instrumentation was supplied by Philips Electronics & Pharmaceutical Industries Corp., New York.

● **Self-fluxing sinter is produced at the plant by agglomerating iron ore fines, limestone, dolomite, and coke.**

Each of the three sinter strands, built by Dravo Corp., Pittsburgh, has its own raw materials system. Materials are delivered to storage bins, then metered onto conveyor belts in the right proportion by automatic weighing equipment. Disc pelletizers blend the ingredients and continuously discharge a homogeneous mix, which is conveyed to the strands.

The top surface of the final mix (after it is deposited on the sinter strand) is ignited as it passes under a gas fired ignition furnace. Air is pulled down through the ignited mix as it travels toward the discharge end of the machine on an endless, grate type conveyor. When sintering is completed, the product is crushed, screened, and cooled.

● **Samples of the finished sinter are collected every 4 hours by automatic machines.**

Each 700 lb sample is quartered to 175 lb and sent to the laboratory, where the material is processed in jaw crushers, roll grinders, and riffle boxes. About 100 grams of the finely pulverized sinter is passed through a 200 mesh screen.

Sinter samples are delivered to a technician who operates the x-ray analyzer. The samples are poured into 1¼ in., aluminum rings and pelletized in a hydraulic press that has a rating of 80,000 psi. The aluminum ring, compressed with the powder, keeps the sample intact. The pelletizing method was developed by the corporation's Applied Research Laboratories for use with sinter and other glassy or slag-type materials that do not bind together readily.

In the near future, newer equipment will permit the laboratory to

METALGRAMS

UNION CARBIDE METALS

. . . news of "Electromet" ferroalloys and metals

JANUARY, 1961

CLEANER STEELS-HIGHER QUALITY -- "Silicomanganese deoxidation in the furnace produced average cleanliness better than any other furnace practices tried," the 1957 Open Hearth Conference was told. The cleaner steel produced with silicomanganese additions has better surface quality and mechanical properties. Silicomanganese not only produces fewer inclusions, but also forms more desirable inclusion types. Other advantages: improved forging and rolling properties, lower conditioning costs, and increased mill yield.

* * *

DATA FAVOR SILICOMANGANESE -- Production data has shown that lowest scarfing costs are obtained with a heavy silicomanganese block. Silicomanganese also reduces hot shortness of some high-sulfur steels and generally improves the quality of other steels. Long internal seams that cause rejections in the finished product are also reduced with a silicomanganese block. Have your Union Carbide Metals representative show you how you can improve the quality of killed steels used for all applications. Also, ask for the article, "Silicomanganese Produces Cleaner Steels", in the Winter 1961 issue of UNION CARBIDE METALS REVIEW.

* * *

LOW COSTS WITH CHARGE CHROME -- In recent years, the use of charge chromes in stainless steel melting has increased markedly. The reason: they are the lowest-cost ferrochromes available. Union Carbide Metals offers three alloys with different chromium, carbon, and silicon contents to meet individual practices. UCM's studies using a high-speed computer have helped steelmakers select the charge chrome that will give lowest costs. Look to Union Carbide Metals for help on the most economical use of charge chrome alloys. For more information, write for the article, "Predicting Minimum Materials Cost for Stainless Steel", in the Spring 1959 issue of UNION CARBIDE METALS REVIEW.

* * *

WHY BUY AMERICAN? -- Ferroalloy imports doubled between 1955 and 1959. Steel, iron, and nonferrous imports are up sharply too! Foreign producers have low wage rates which enable them to compete on a price basis with the U. S. However, they cannot compete with U. S. producers on three counts: (1) valuable metallurgical assistance at a user's plant, (2) consistent quality in all materials, and (3) products delivered when the customer wants them. For further information, write for the article, "Why Buy American?", in the Fall 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

MANGANESE IN ALUMINUM -- In binary alloys, manganese improves the strength of aluminum by 20 per cent with no sacrifice in corrosion resistance. Thus, 3000 series alloys (containing 1.25 per cent manganese) are good general-purpose alloys for storage tanks, piping, furniture, TV antennas, awnings and siding, and chemical equipment. Manganese is also added to 2000, 5000, and 6000 series alloys to improve corrosion resistance. UCM offers low-iron ferromanganese and "Elmang" electrolytic manganese for such additions. More information can be obtained by writing for the article, "Manganese Puts Muscle in Aluminum", in the Winter 1961 issue of UNION CARBIDE METALS REVIEW.

* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Ltd., Toronto.

"Electromet," "Elmang," and "Union Carbide" are registered trade marks of Union Carbide Corporation.

use the entire 700 lb sample.

• The laboratory analyzes 18 sinter samples daily—and could handle many more.

Sequential, x-ray instrumentation automatically selects the right counter and analyzing crystal for each element being determined. The instrument analyzes each sample for calcium, iron, manganese, silicon, magnesium, and aluminum. All elements except manganese are run on two adjacent channels for increased accuracy. The instrument makes the quantitative determinations for six elements in 25 minutes.

In most applications, it isn't necessary to use two channels for each element. But that procedure is followed at Saxonburg for greater accuracy. Low concentrations of elements with low atomic numbers—12 to 16—produce fewer counts per second; precision determinations of such elements with usable counting times are difficult. Use of two channels for magnesium and aluminum allows the final analysis to be based on 2000 counts, instead of 1000 from a single channel.

In day-to-day operation, the laboratory uses the arithmetical average of the two channel readings to provide better precision. On one occasion, widely different readings on the two channels indicated trouble in the instrument circuitry.

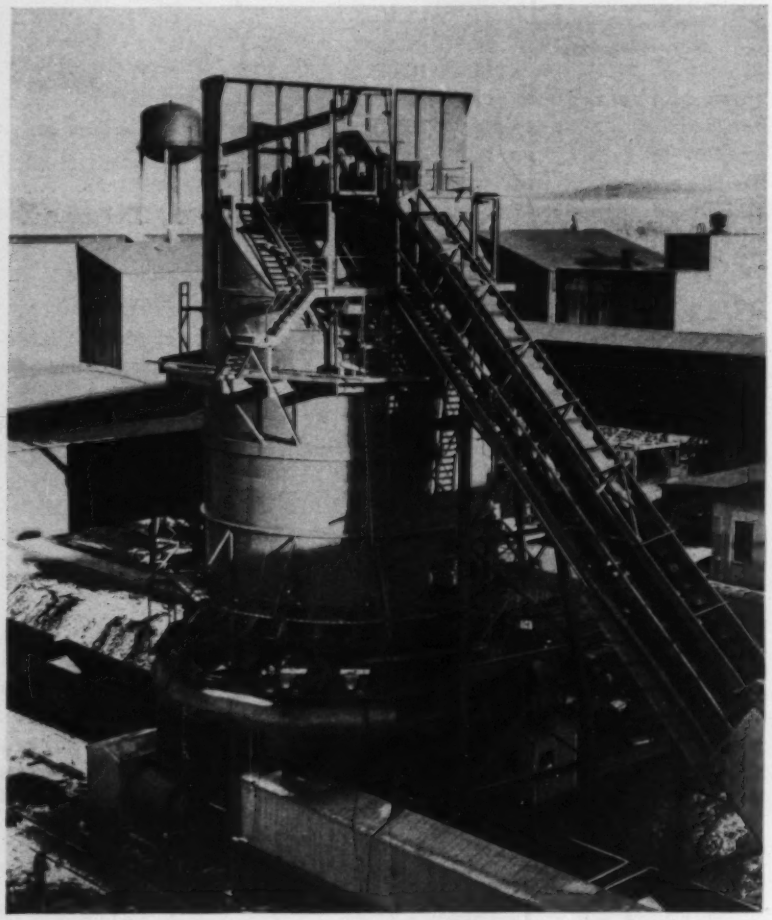
• When time permits, the laboratory uses the instrument to analyze raw material.

Iron ores are examined for iron, silicon, aluminum, and manganese content. Limestone and dolomite samples are analyzed for calcium, magnesium, silicon, aluminum, manganese, and iron. Results have often been checked against wet chemical analysis; excellent agreement is reported.

The quality control program makes use of the instrument to analyze 18 to 30 sinter samples and 6 to 12 ore samples daily—a total workload of 24 to 42 samples in a 24 hour period. Previously, by wet chemical techniques, one technician analyzed about three sinter samples per shift and did a few raw material analyses. Determination of each sample took about 24 hours; even shortcuts that sacrificed some accuracy and reduced analysis time to 8 hours didn't permit adequate control over the chemistry.

Sinter Cooler Redesigned

Vertical unit offers longer exposure to air



COOLING EQUIPMENT that looks much like a blast furnace (and maintains that similarity in its principle of operation) has been added to sintering facilities at New York Ore Div. (Star Lake, N. Y.) of Jones & Laughlin Steel Corp.

The cooler, which has a rated capacity of 3800 gross tons daily, was designed and installed by Dravo Corp., Pittsburgh.

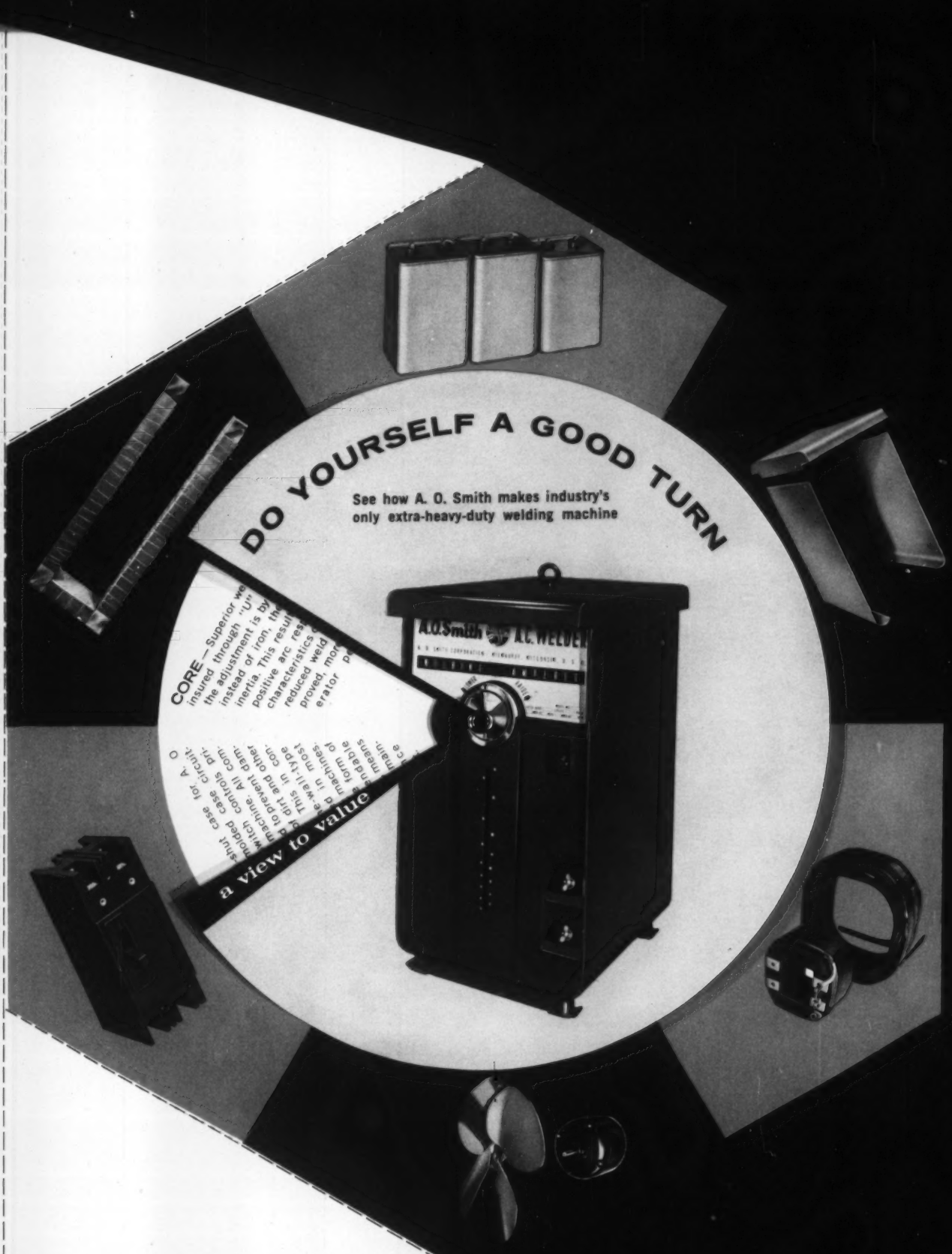
• Longer exposure to air is said to provide more effective cooling.

How the equipment differs from conventional, rotating coolers: It is stationary, and the product is cooled by blasts of air as it works downward in a vertical column, 100 ft high and 44 ft in diameter.

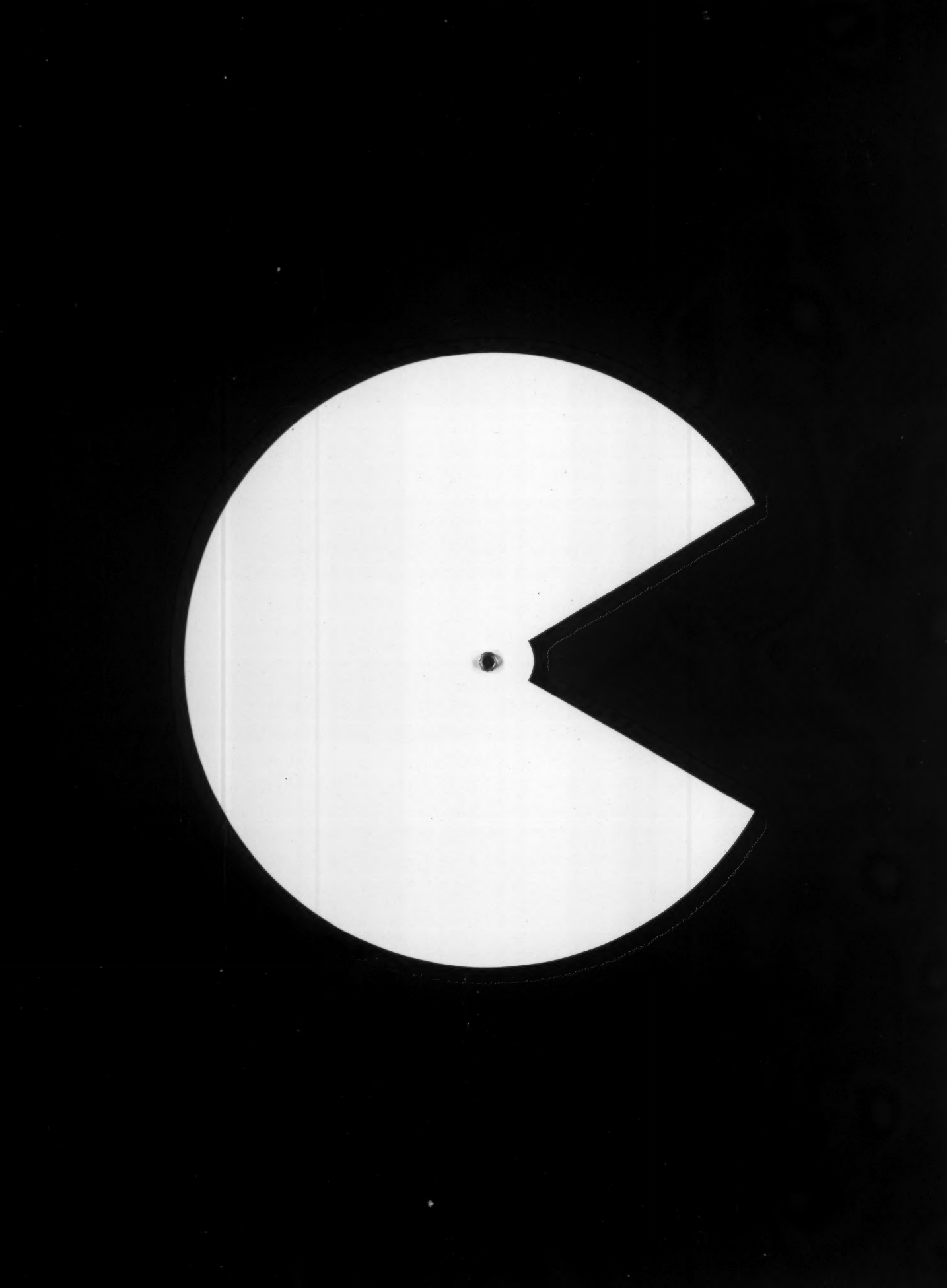
"The cooler exposes sinter to cooling air for longer periods," says R. Grant Fleck, manager of the division. "Sinter is cooled as long as 1½ hours vs. 15 to 20 minutes in a circular system."

• The installation also includes new breaking and screening facilities.

Fused sinter, discharged from two strands onto an apron feeder, is carried to a new breaker, then passed through a new, vibrating screen, which removes hot fines. A pan conveyor delivers the screened product to the cooler. At the cooler discharge, a fender-screen removes cold fines and delivers the cooled sinter to railroad cars.



To detach — just tear along dotted lines



CAPACITORS — Standard with A. O. Smith Extra-Heavy-Duty welders is the industry's maximum power factor correction — capacitors deliver 134 M.F.D. total. This high power factor means that the current taken from the primary line is lower than with any other machine when comparable ratings are matched. This more efficient use of primary power means more money saved through lower power bills.
SHELL—A. O. Smith Extra-Heavy-Duty welder is enclosed in an attractively designed, sturdy steel shell. Heavy-gauge steel throughout to withstand the roughest treatment. Frame and case retain "new" appearance throughout exceptionally long machine life. No danger here of being prematurely traded on the basis of looking "worn out." A machine that doesn't look its age lives longer.
CORE—Superior welding characteristics are insured through "U" core design. Because the adjustment is by magnetic field in air instead of iron, there is less electrical inertia. This results in a faster, more positive arc response. Better arc characteristics cut costs through reduced weld repair and improved, more efficient operator performance.
COILS — A. O. Smith's extra-heavy copper coils are the heaviest in the field—primary and secondary coils together weigh 185 lbs. on a 500-amp machine. This is more than with any other. Vacuum-impregnated coils have temperature rise of only 55°—lower than with any other. Insulation — the highest temperature class "H". Features in use which insure longer machine life.
COOLING SYSTEM — No other machine packs so much cooling power. Biggest fan in the field. Air is circulated by an 18-inch industrial-type fan — dynamically balanced and scientifically pitched to deliver maximum ventilation down through the coils. Power behind the fan is a big, totally enclosed, lifetime-lubricated motor providing more air for cooler operation and longer life.
SWITCH — Open-and-shut case for A. O. Smith superiority. A molded case for circuit-breaker-type on-off switch controls primary power to this machine. All components are enclosed to prevent dangerous entrance of dirt and other foreign materials to home in most switches used in most other welding machines. This is the most reliable, means safe, dependable operation in the form of reduced maintenance cost.

To detach — just tear along dotted lines

ONLY A. O. SMITH LETS YOU PAY YOUR MONEY AND TAKE YOUR CHOICE!

Why pay your money and take a chance? A. O. Smith lets you pay your money and take your choice — a **value** choice of both Extra-Heavy-Duty and Standard-Duty welding machines.

The value gauge on the front of this advertisement tells the inside story of A. O. Smith Extra-Heavy-Duty welders. It reveals that A. O. Smith is the only manufacturer that still builds a real Extra-Heavy-Duty welding machine — a welder designed and constructed with safety factors established 20 years ago for long life under the most severe operating conditions.

But, of course, for standard duty, A. O. Smith offers the MonArc shown at left. Here is industry's quality, low-cost welder. Available in 300, 400 and 500-amp models. More copper in the coils than any other competitive welder of the standard class, means this rugged welder will give you years of dependable operation. The MonArc is the picture of compactness. It racks! It stacks up to three high! It slides under a bench. Fits where others take up valuable floor space.

See them both at your A. O. Smith distributor. Or write for full details.

Through research . . . a better way

A.O.Smith
CORPORATION

WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin
A. O. Smith INTERNATIONAL S.A.,
Milwaukee 1, Wis., U.S.A.

Teflon-Insert Die Tames Toughies

- ***New technique eliminates guide pins and die matching.***
- ***Interchangeable punch and die inserts cut costs.***
- ***Dies are equally effective in hydraulic or mechanical presses.***
- ***Dies do not mark or coin flanges.***

A FORMING PROCESS that takes advantage of Teflon's natural lubrication accurately shapes thin, high strength pieces of titanium and stainless steel. It has cut production costs a full third at the Aeronautics Div., Chance Vought Corp., Dallas.

The method, which uses a layer of Teflon as the bottom die face, is also credited with an increase in the quality of parts produced.

The technique was developed to handle Armco's PH 15-7 Mo stainless for advanced aircraft and space vehicle projects. The tolerances of some parts practically eliminated regular rubber press techniques in forming light gage metals like those employed in brazed honeycomb assemblies. Rubber flows at pressures far too low to form stainless to 0.002 in. tolerances with no springback, says Chance Vought.

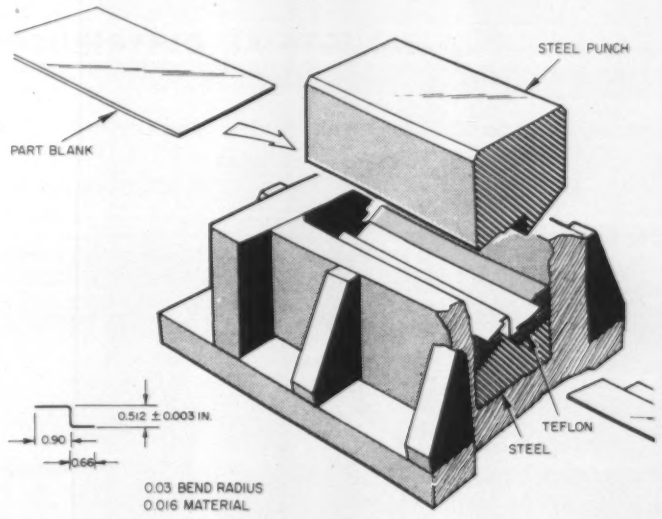
• You need a universal steel box or trap faced on the bottom with a Teflon insert. Blanks are laid in the box, indexed by locating pins, and formed by a steel punch contoured to fit the correct part dimensions. Hydraulic or mechanical presses produce pressures up to 18,000 psi in the die space.

During forming, the Teflon yields and flows in much the same manner as rubber. It becomes a matching die for the steel punch. The surrounding box traps and retains the Teflon. Variations of part configurations, including thickness tapering, can be formed with the same setup by merely changing punch and Teflon insert, experts state.

The sides of the steel punch fit the box or trap snugly. The female doesn't require coping or close fitting to mate. Teflon is merely cut to an appropriate shape. That feature accounts for most of the savings in tool fabrication time.

The company says the technique works on both impact and hydraulic type presses because the principle is much like coining. All its work with the technique was done cold.

Normal safety precautions were employed in machining the Teflon to prevent spreading the plastic chips or dust. The Du Pont material can create a safety problem when it is changed into a gas by high machining temperatures.



This part (left) was formed on a 1000 ton hydraulic press. It required 5300 psi to form from a flat blank (it was reversed and rehit). Web height was held to less than 0.001 in.; flange bevel, 1 degree open

A LABORATORY IN JOHANNESBURG IS WORKING FOR YOU

Possibly you have never even heard of the Diamond Research Laboratory of Johannesburg. Yet its findings are of great importance to every user of industrial diamonds.

Established in 1947, the Diamond Research Laboratory is sponsored by Industrial Distributors (1946) Ltd. Its work is devoted exclusively to investigations on all phases of the diamond.

In its brief 13 years of existence, the Laboratory's developments have been of great significance. They include:

- increase in efficiency of natural diamond grit in resin and metal-bond grinding wheels
- considerable improvement in design and performance of diamond drill crowns
- development of electrolytic method of resharpening tungsten-carbide-tipped percussion drill bits
- development of diamond thermistors for highly accurate temperature measurements
- vector orientation, by X-ray, of diamond tool stones

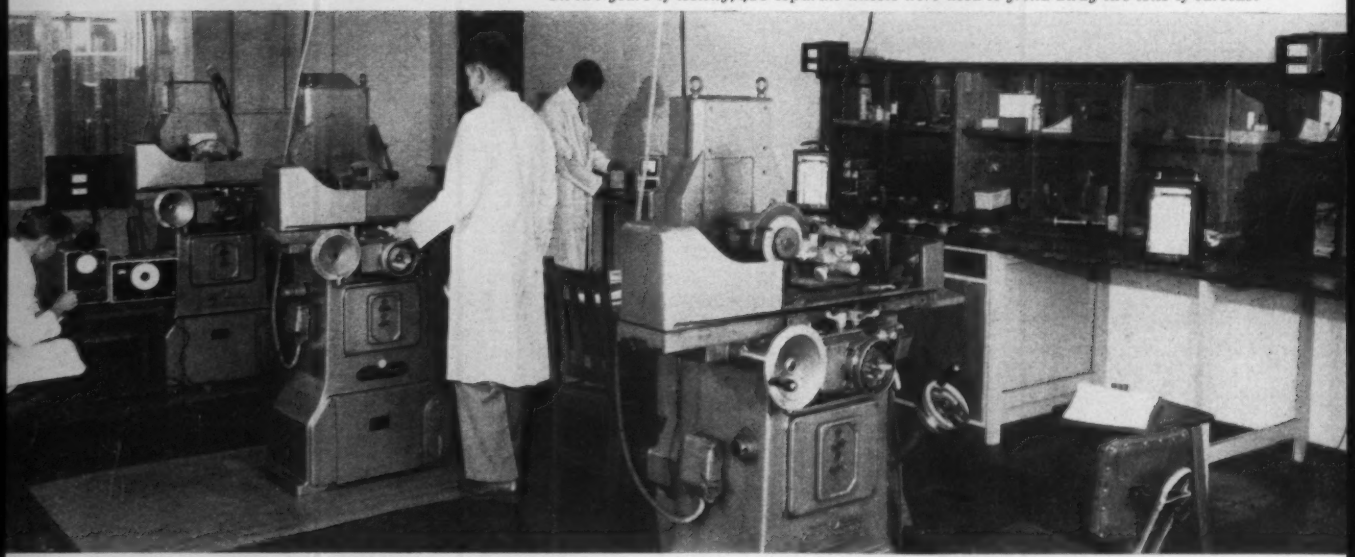
Obviously, this intensive—and costly—research cannot be carried on by individual users of industrial diamonds. But Industrial Distributors, world distributors of natural industrial diamonds, has undertaken this responsibility for interested users throughout the world.

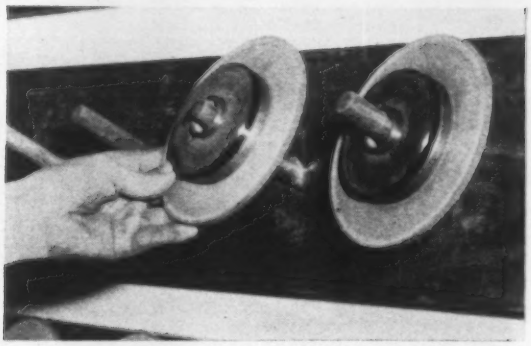
The Diamond Research Laboratory is in Johannesburg. But it's working for *you*.

INDUSTRIAL DISTRIBUTORS (SALES), LTD., LONDON

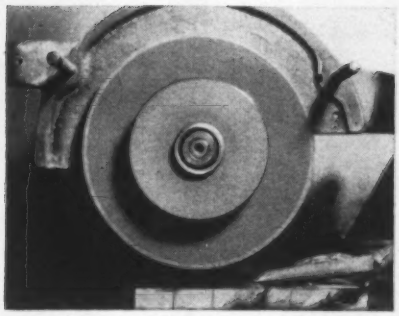
INDUSTRIAL DIAMONDS CUT PRACTICALLY EVERYTHING . . . ESPECIALLY YOUR PRODUCTION COSTS

Resin-bonded diamond grinding wheels are tested in a carefully controlled experiment. In two years of testing, 450 separate wheels were used to grind away two tons of carbide.



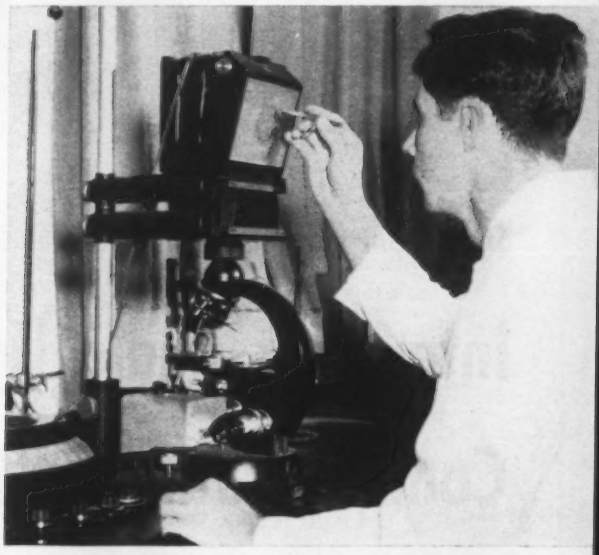


A specially developed type of grit enables resin-bond diamond wheels to grind rapidly and efficiently.

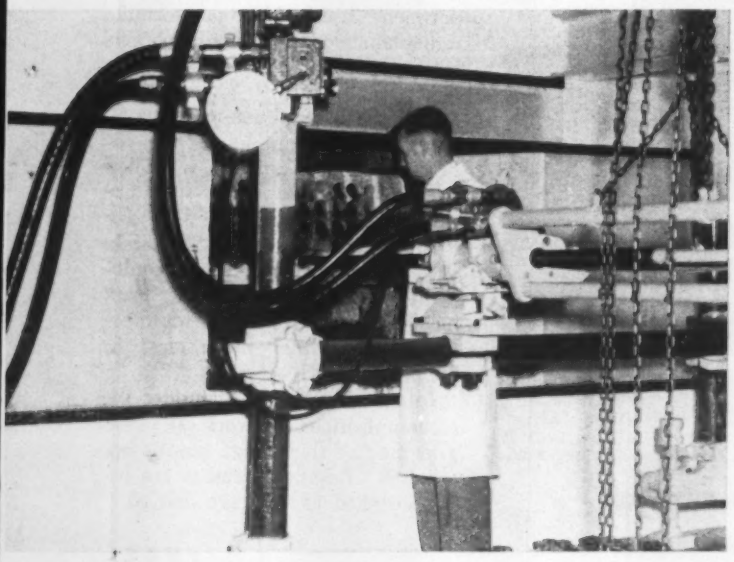


A diamond abrasive wheel is tested at the Diamond Research Laboratory by surface grinding a block of tungsten carbide.

Staff member counts number of diamond grit particles which appear on the screen of a microscope. This instrument was especially developed for checking the shape of diamond grit.



Laboratory drilling machine tests the efficiency of diamond drill crowns in granite.



IF YOU ARE INTERESTED

in the Laboratory's work, please fill in this coupon. You will receive a copy of this attractive booklet outlining the function and the findings of the Diamond Research Laboratory.

DIAMOND RESEARCH LABORATORY
Johannesburg, P.O. Box 104, Crown Mines
Union of South Africa

Please send me a copy of THE DIAMOND RESEARCH LABORATORY.

*Name*_____

*Company*_____

*Street*_____

*City*_____ *State*_____

*Country*_____

Steel Plant yardmaster goes on the air, as . . .

Interplant Radio Upgrades Communication Efficiency

Trucker announces he's ready for the next job

TWO-WAY radio holds the key to effective communications within the sprawling Inland Steel Co. facilities at East Chicago, Ind.

Although separate control points are used for each of four departments, the entire system is licensed on a single frequency—153.050 mc. So each department is provided communications for its operations, yet the activities of the entire company are brought together.

Inland spokesmen say the system saves manhours by getting crews to jobs faster. They also credit the network with giving them better control of the operations and can trace an increase in productivity to it.

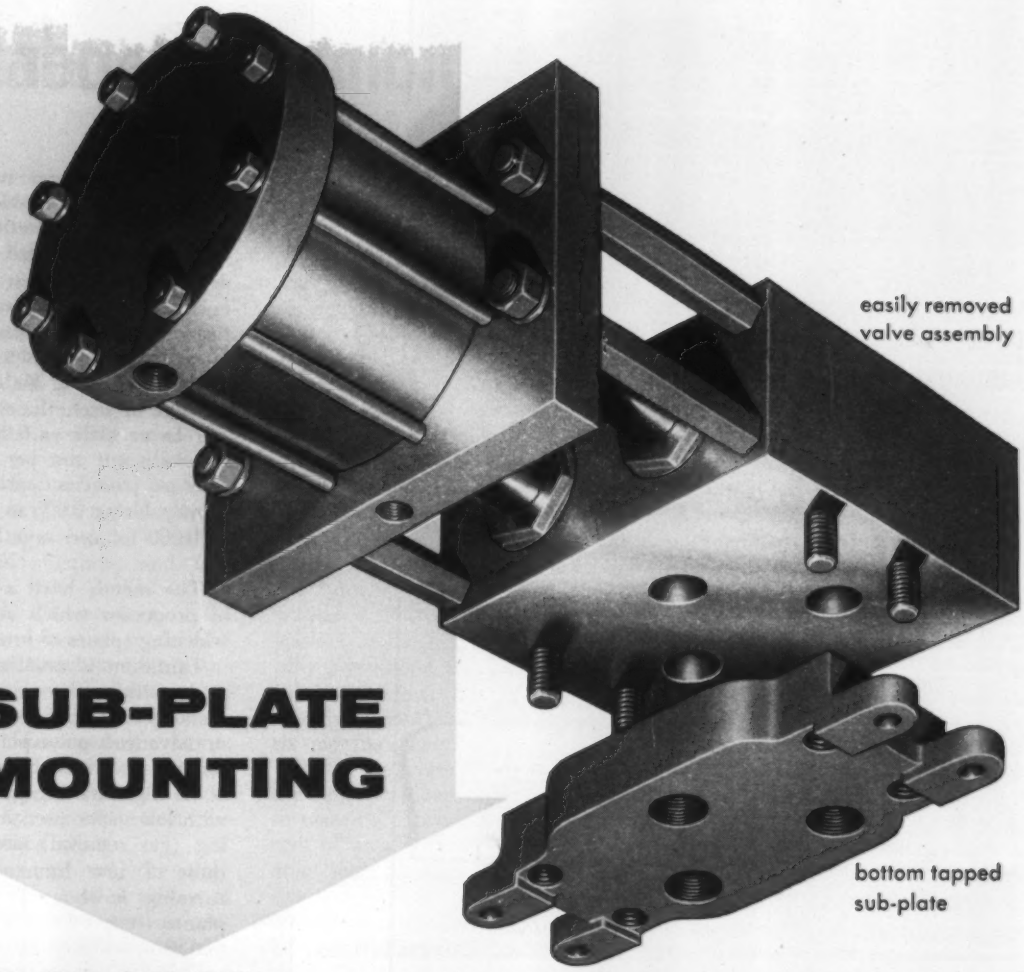
• Nearly 100 mobile radios are utilized by the transportation, yard, stores and refractory, and plant protection departments.

The network (made, installed, and maintained by Motorola) includes 19 remote dispatching points. The transportation department has 41 mobile units installed in diesel engines. One, rubber tired crane and 15 railroad cranes are radio equipped, and the department foreman has a radio in his truck so he can be in touch even when he's away from the office. In the stores and refractory department, 28 radio equipped vehicles are used to haul personnel, to cover repair jobs, and to handle a variety of maintenance and service functions. The plant protection department has radio equipped three police cars, three pieces of fire fighting equipment, and an ambulance. In addition, the plant protection department uses Motorola portable radiophones for communications between patrolmen and headquarters.

A single base station provides 50 watts of power output for the entire system. The antenna is located atop a penthouse on a six story Inland building.

An agreement with Motorola covers the servicing of all equipment in the system. The work has been subcontracted by Motorola to a firm (Miner Electronics) in Hammond, Ind.

Inland officials now consider the communications network an integral part of their huge plant's operations. Additional radios are being installed as they are needed.



SUB-PLATE MOUNTING

for HUNT Hydraulic Valves

- ***easier maintenance***
- ***minimum downtime***

Designed to fit into today's preventive maintenance programs, Hunt's new sub-plate mounting permits quick valve removal and installation.

With sub-plates, equipment downtime is cut to an absolute minimum . . . valves can be repacked in your maintenance shop instead of on the machine. And, once installed, permanent piping need never be disturbed.

O-ring seals between valve body and cast steel sub-plate assure leak-free sealing . . . bottom tapping of sub-plate affords maximum access to valves and eliminates piping clutter.

Sub-plate mounting is available on all ½ through 2 in. Hunt hydraulic valves.* To learn more about the performance and cost-cutting advantages of Hunt valves, contact your nearby Hunt representative.

*Except those with cast or forged bodies.

HUNT

QUICK-AS-WINK® AIR AND HYDRAULIC

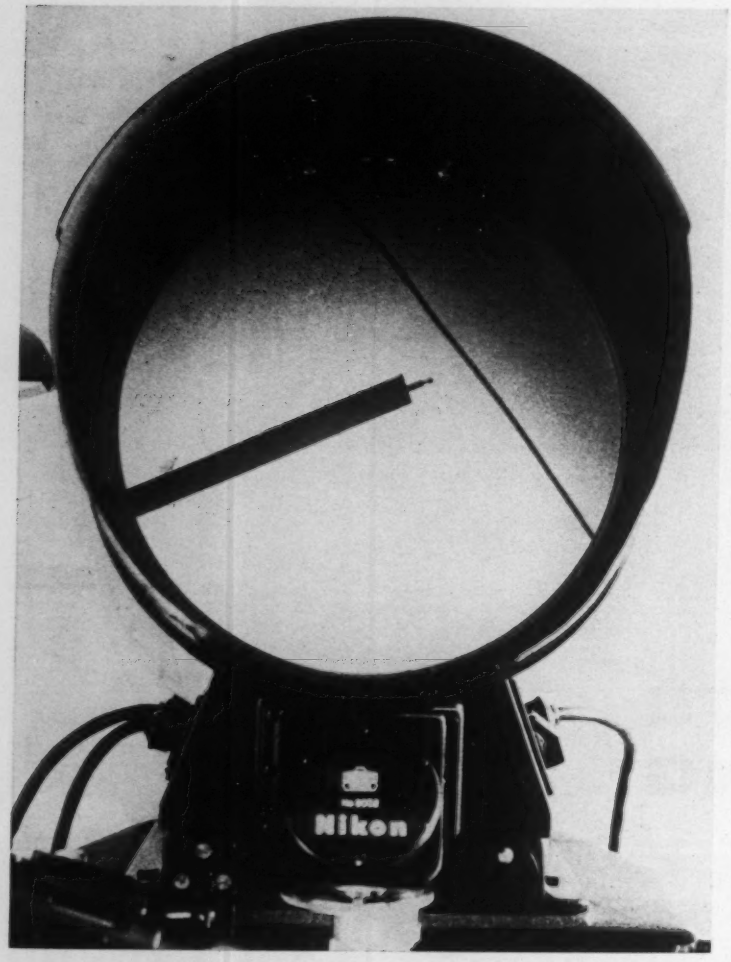
VALVES

HUNT VALVE COMPANY • DIVISION OF IBEC • SALEM, OHIO

Want more detailed information? Write Dept. ST-161, Hunt Valve Company, Salem, Ohio. Ask for Bulletin 604.

3002

Paper Thin



Thermocouple, human hair compared. Sheath is . . .

IF EXOTIC metal tubing would solve a material problem for you, there's help in meeting the cost problem—thin walled columbium or tantalum tubing.

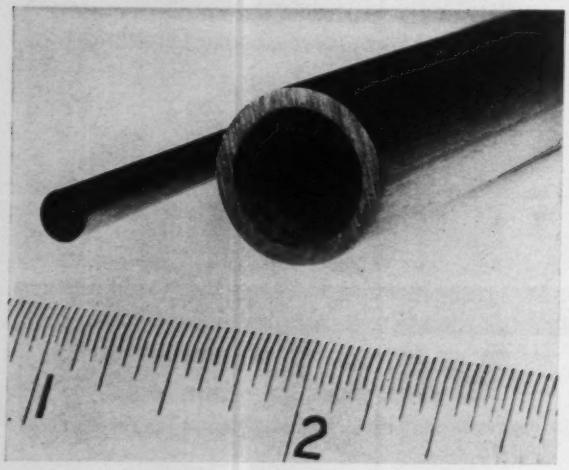
It uses less metal, combines corrosion and heat resistance with good thermal transfer. Made by J. Bishop & Co., Malvern, Pa., in a range of sizes, the wall thickness can be as little as 0.002 in. Thinner walls cut cost per foot, though price per pound is upped. Take ½ in. tubing: Using 0.005 in. wall instead of 0.060 in. can save $50 per foot.

• The metals have a combination of properties which are creating a widening sphere of interest.

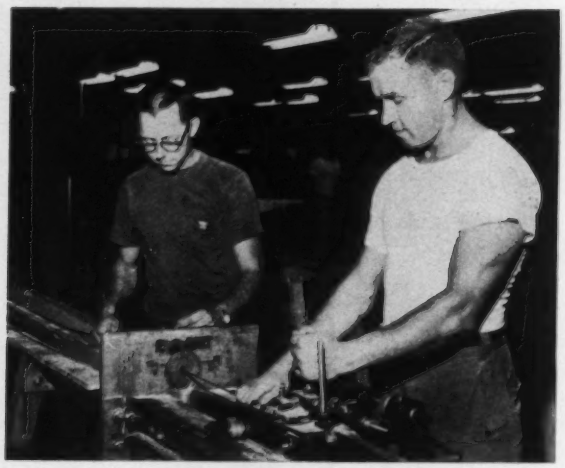
Tantalum is unaffected by most acids, withstands many of the liquid metals being used for heat transfer in advanced powerplant design, is applied in vacuum tubes because of its high melting point combined with low vapor pressure and gettering (gas removal) properties. And quite a few human beings are carrying it about as surgical implants (it is tolerated by the body and not attacked by body fluids).

Columbium has similar properties. It's said to be somewhat less

thin walled tubing made by . . .



drawing over a mandrel



Tantalum, Columbium Cut Weight

resistant to corrodents, has higher hardness and elongation.

• The high corrosion resistance of the metals means that thick sections are not needed for good service life in many applications.

Typical of the applications for the thin walled tubing is the high temperature thermocouple and protection tube assembly made by Continental Sensing Inc., Melrose Park, Ill. It sports a tantalum sheath, uses beryllium oxide for insulation. Thermocouple wires are tungsten and rhenium, and such couples have been calibrated to 4000° F with an accuracy of 0.1 millivolt, the company reports.

A sheath of tantalum tubing also protects a miniature thermocouple unit made by High Temperature Instrument Engineering Corp., Philadelphia. The sheath is 0.014 in. in diameter. Two insulators only 0.003 in. across protect the 0.001 in. sensing wires.

Tiny units are not the only places where thin walled tubing of tantalum and columbium are employed. Larger diameters of the product are used to clad the inner or outer surfaces of stainless steel in some types of heat exchangers and for corrosive chemicals.

• Obtaining the thin walled tubing wasn't as easy as recognizing its potential usefulness.

Both metals have a pronounced tendency to seize and gall, especially in drawing dies, Bishop found. They're quite ductile, but the problem of cold welding to the carbide dies had to be licked before the ductility was any help. One method of overcoming the problem has been the use of oxide conversion coatings, which had been used in the drawing of wire. But Bishop wanted a lubricant which could be applied at the draw bench to simplify operations and cut costs. A lubricant which has proved practical in production evolved from a six months' study.

With the present lubricant and drawing procedures, it is possible to take a reduction of 70 to 80 per cent of area between anneals. It's done with a series of four successive draws. And to get down from the starting dimensions of 5/8 in. OD and 0.065 in. wall to tubing measuring 0.125 in. with 0.002 in. wall takes 12 drawing passes with annealing after each group of four.

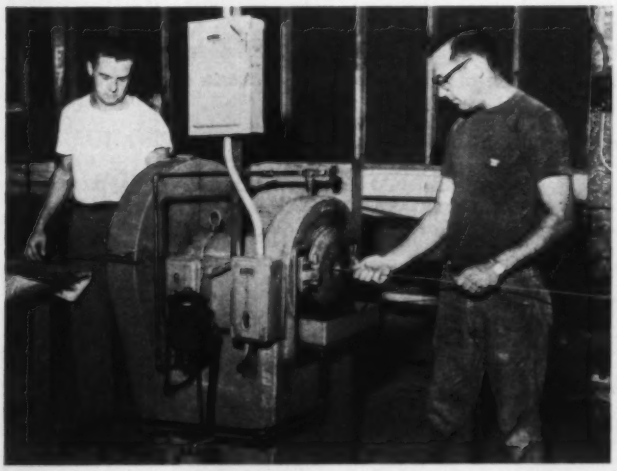
• The very properties which make the metals valuable as getters in vacuum tubes make for problems in processing and annealing.

They aren't drawn hot, and must be annealed in a vacuum, because they pick up gases from most atmospheres at temperatures in the range 700 to 900° F or above. They would absorb oxygen, hydrogen, and even nitrogen under those conditions. So they are annealed in a special tubular furnace, under vacuum, for about 30 minutes at a temperature between 1850 and 1950° F. Cooling is also done under vacuum.

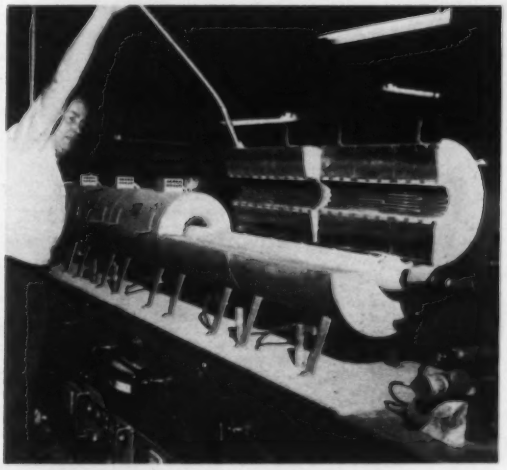
To support the thin walls of the tubing during reduction, and to control concentricity and interior surface, a mandrel is used as the tubing is pulled through the carbide dies. It must be removed after drawing. That is accomplished by swaging the drawn tubing on the mandrel. The swaging expands the tubing.

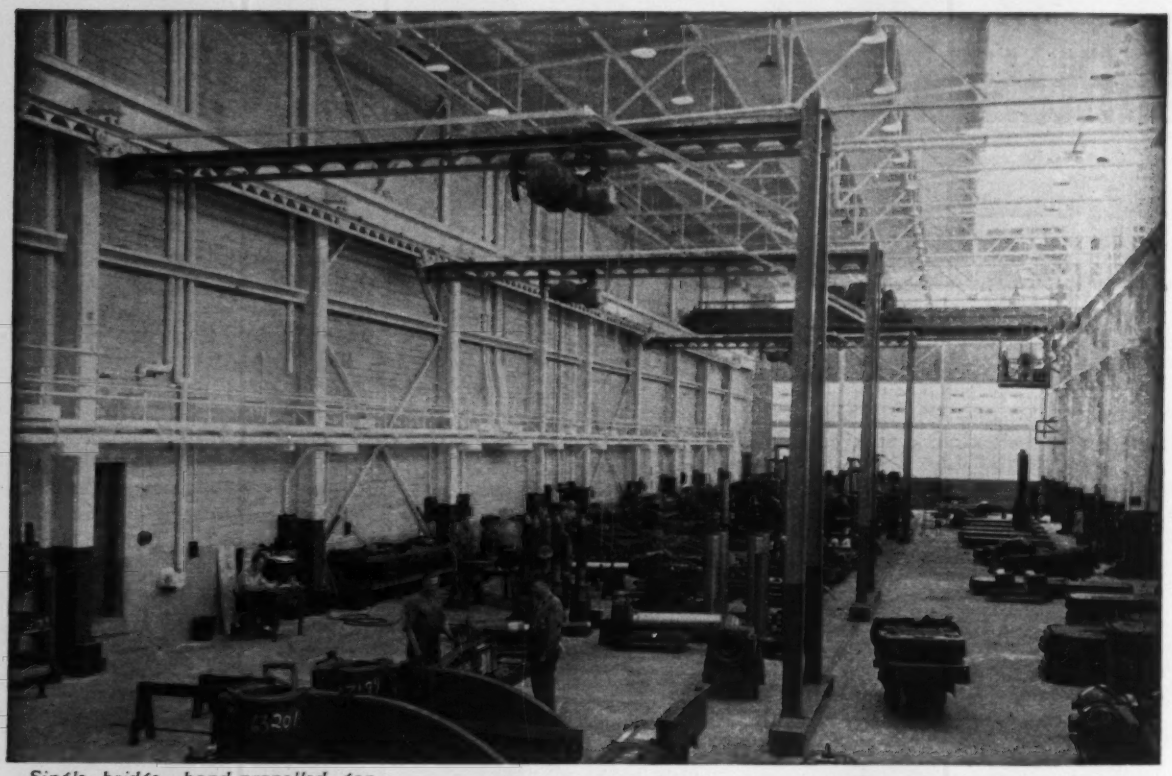
Bishop produces the exotic metal tubing in sizes ranging from 0.009 in. OD, 0.004 in. ID to 1 in. OD with 0.008 in. wall thickness.

Swaging expands tube from mandrel

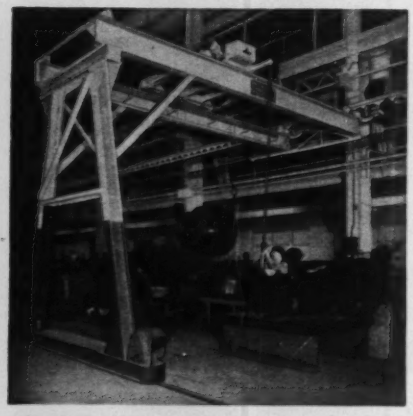


Annealing done in vacuum furnace





Single bridge, hand-propelled gantries with electric hoists operating under heavy overhead crane in a machine tool plant.



Double girder, completely motorized gantry. Because gantries ride on a floor rail and one wall rail, their use often eliminates need of long span overhead cranes.

GANTRY CRANES BOOST PRODUCTION

IT is not unusual for skilled workers to wait 5 or 10 minutes and more in many shops for crane service. By providing a sufficient number of gantry cranes, much or all of this lost time can be eliminated and production aided.

Efficiency usually can be greatly improved by providing one large overhead crane for each shop bay — for the heavy lifting and transportation from one end of bay to the other — and a number of gantries to work under it, to do the light local or spot handling.

Several Cleveland Tramrail gantries generally can be purchased for the price of a large overhead crane and are available for manual or electric operation.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7809 East 284 Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Drilling, Tapping Unit Adaptable to Special Work

THE SERIES A, two spindle drilling and tapping machine made by Cleereman is rapidly adaptable to special applications, the company says.

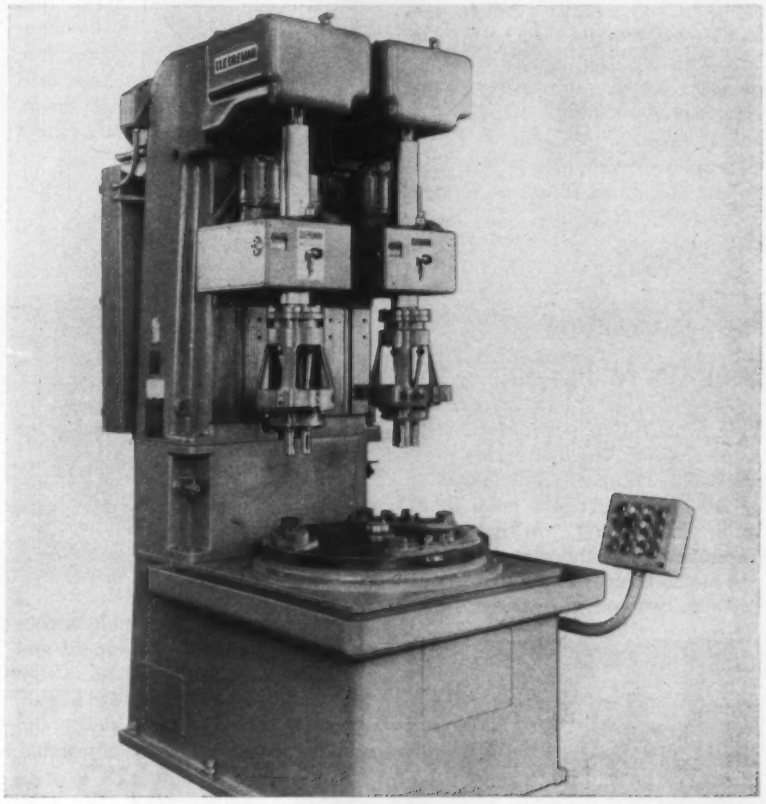
Two or more columns are mounted on a special base. Precise, high production rates can be obtained with the rotary type index tables.

A complete cycle is obtained at all stations simultaneously by pushing a button. The setup permits the operator to remove the finished part while the tools are working and load another at the loading and unloading station.

Easy setup, pickoff change gears, broad speed ranges, feeds, and tap leads are cited among aids for small lot or production runs.

The company says it followed the building block concept to provide low cost initial investment and easy changeover to new and different work. Single spindle and multiple head automatic types are available.

For further information, *write* Jackson-Fotsch Co. (general distributors for Cleereman Machine Tool Corp.), 7350 W. Lawrence Ave., Chicago 31, Ill.



Basic Milling Units Used in Special Machine

THE BUILDING block principle was used in developing a semiautomatic U. S. Duplex Half-Mill from basic milling units. The machine was designed to square both sides of three ½ in. thick steel plates simultaneously in production lots.

Variations of the unit can perform slotting, sawing, keyway cutting, face milling, slab milling, boring, and a variety of other operations.

The machine has two standard #40 taper spindle heads, standard cross slides, and a standard hydraulic system with full electrical controls. The two milling heads have roller bearing spindle mounts and are powered by 1½ hp, 1200 rpm drive motors with selective spindle speeds up to 2370 rpm.

Both Half-Mills are equipped with manual screw, vertical adjustment and are mounted on manually positioned cross slides. The machine's 10 x 42 in. table with box type slide is powered by an 18 in. stroke hydraulic system and has a hand fitted, tapered gib and one shot lubrication.

The hydraulic feed unit has panel mounted electrical controls and is independent of the machine. The hydraulic unit provides rapid traverse approach, controlled cutting speed and distance, plus automatic rapid table retraction. Conveniently located trip dogs may be repositioned to alter the feed cycle as required.

Machine operation starts with the

loading of three steel plates into the air operated fixture. Spring loaded locators center the plates midway between the cutters. The positioning of the locators is adjustable for different work widths.

Once the starting button is pressed, the table rapid traverses to the milling position, feeds at a rate of 12 in. per minute through opposed spindles with inserted carbide face mills and automatically rapid traverse returns to square three plates simultaneously.

For further information, *write* U. S.-Burke Machine Tool Div., Cincinnati Mfg. Corp., Brotherton Road & Pennsylvania Railroad, Cincinnati 27, Ohio.

Fork Truck Mast Goes Up to 144 in.

THE GASOLINE powered Handler is a compact, maneuverable fork truck with a capacity of 1200 lb at 24 in. load center and 1500 lb at 18 in. load center. A hydrostatic transmission is employed.

A single lever controls two speeds forward, two speeds in reverse, lifting action, instantaneous reversing, and "dead man" brakes. The single column, three stage mast gives a lift of 144 in.

The air cooled, 7 hp engine has an electric starter. The unit can be equipped for LP gas operation.

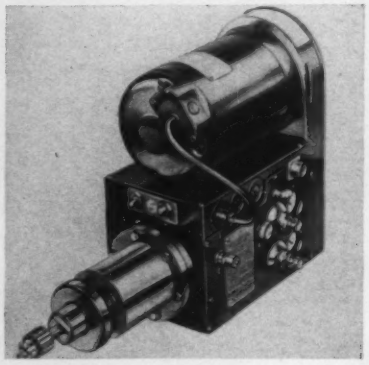
For further information, *write* Harlo Products Corp., a subsidiary of Kirkhof Electric Co., 4210 Ferry St. S. W., Grandville, Mich.

Drill Units Have Spindle Speeds to 15,500 rpm

HIGH SPEED, automatic drill units made by Dumore have spindle speeds from 800 to 15,500 rpm for production of holes from about 0.020 to 0.25 in. in diameter.

In addition to higher production, the company claims the high drill speeds provide better hole finish, longer carbide tool life, and cleaner, burrfree holes.

The units come with motor, traversing spindle, and built-in controls. The spindle is advanced and retracted by air pressure (from plant air supply). Stroke length, advance and retract rate, and spindle thrust are fully adjustable. Drilling speed is adjustable in steps through selection of driving pulleys. Series 34 and 36 are available. Electrical circuitry on the Series 34 permits co-ordinating operations with other machines or equipment for automatic and semi-automatic operations.



For further information, *write* Dumore Co., 1300 17th St., Racine, Wis.

Sheet, Tin Plate Hardness Improved by Static System

HARDNESS control for mills producing sheets and tin plate can be improved with a digital extensometer, says Allis-Chalmers. The all static system measures the amount of elongation of cold rolled strip as it passes between the work rolls of a reduction mill.

With digital techniques, the company says systems can be built with inherently high accuracy and with sufficient flexibility to allow for rapid adaptation to constantly changing parameters. On temper mills, it is capable of measuring exceedingly small elongation (0.5 per cent or less) and making rapid compensation for changes of mill components such as roll diameters and gear ratios.

The system computes and displays continuously the amount of elongation (in percentage) by analog indication, digital indication, continuous record, or numerical storage.

For further information, *write* Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

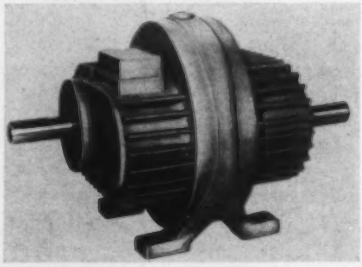
5 hp Transmission Does High Speed Positioning

APPLICATIONS such as machine tools, and servo systems can benefit from a 5 hp transmission that reverses in 0.2 second.

It was developed primarily to provide high speed positioning, reversing, and sequencing of loads for automatic systems using card or tape control. Input and output shafts on the unit (called Electromission) are connected through a gear or chain drive (depending on the status of two opposing electromagnetic clutches).

Engaging one clutch provides chain drive for the same rotation of the output shaft as the input shaft. Engaging the other clutch produces a gear drive in a direction opposite to the output shaft.

When both clutches are disengaged, the transmission runs free in a neutral position. A brake can be used in the transmission if the



application requires holding the load in a fixed position when no signal is present. It can be set up to energize automatically in the absence of positioning signals.

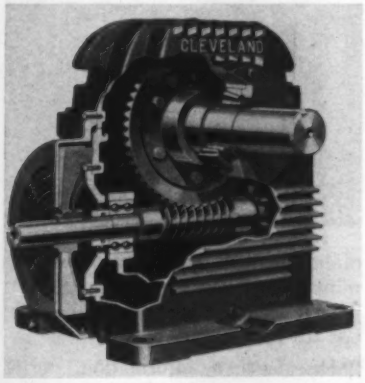
It's recommended for servo systems because low power signals control large power outputs. Simple remote control systems draw control power from a conventional 110 volt supply.

For further information, *write* Industrial Div., Airborne Accessories Corp., 1414 Chestnut Ave., Hillside 5, N. J.

Worm Gear Reducers Up Capacity by Fan Cooling

THE MAKER of a line of worm gear speed reducers claims horsepower capacities up to 80 per cent higher are possible with fan cooled units than with conventional reducers of the same size. It says space savings of 50 per cent and more are possible between two reducers of the same rating.

Nine sizes range between 3 and



12 in. center distances. Ratios extend from 4 1/7:1 to 95:1—ratings from fractional to 175 hp.

For further information, *write* Cleveland Worm & Gear Div., Eaton Mfg. Co., 3300 E. 80th St., Cleveland 4, Ohio.

Motors, Pumps Rated for 3000 psi Continuous Duty

FIXED displacement, axial type piston motors and pumps have been developed for the industrial machine field. The pumps (called the C3F Series) have displacements of

We bet millions on our couplings

When you buy a Fast's coupling, you can bet your bottom dollar everything was built on the spot, not assembled piece by piece from other suppliers. Koppers multi-million dollar manufacturing facilities are the most modern in the industry . . . with advanced program machines, highly accurate gear shapers, a complete forge shop.

For example, all Fast's Couplings are jig-drilled and jig-reamed for greater interchangeability of parts. Result: you get high-quality, smooth-running, long-lived units that are the choice of more equipment manufacturers than any other gear-type coupling.

KOPPERS COMPANY, INC., 301 Scott Street, Baltimore 3, Md.

KOPPERS

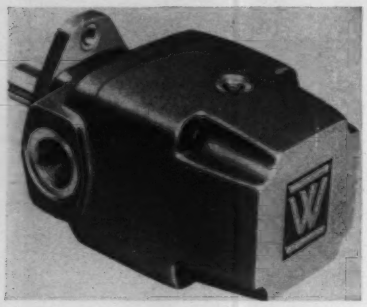
FAST'S COUPLINGS

Engineered Products Sold with Service

0.72, 1.09, 1.45, and 1.81 cu in. per revolution.

They are rated for continuous duty at 3000 psi and for intermittent pressures to 3500 psi. The units can produce 3.3 to 8.5 gpm at 1200 rpm and 5 to 14 gpm at 1800 rpm. Operating speeds go up to 2400 (the largest unit can deliver 18 gpm at that speed).

When used as motors, the four sizes have theoretical torque ranges of 11.52, 17.28, 23.04, and 28.80



in.-lb per 100 psi. Output horsepower ranges from 5.5 to 14 at 1200 rpm and 8 to 22 at 1800 rpm (operating at 3000 psi).

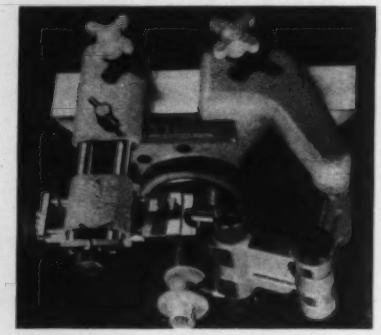
Featured are simple design, easy servicing, reversible rotation, and a variety of mounting styles. The mounting bosses of the pumps are large enough to handle 1 in. NPT inlet or 1¼ in. OD tubing thread. The side ports may be mounted horizontally or vertically. Several variations of driveshafts are available.

For further information, *write* Webster Electric Co., Racine, Wis.

Grinding Wheel Dresser Handles Complex Shapes

YOU CAN dress complex shapes in grinding wheels to tenths of an inch accuracy, says the maker of the Tracaform Model SMD-704 dresser. The 1:1 ratio template tracing wheel dresser is designed to fit most surface grinders using a wheel 7 in. or less in diameter.

The spindle mounted unit may be left on the machine permanently or it can be moved from one machine to another. The mounting casting is bored to fit a 3 in. diameter standard spindle and clamps securely when two screws are tightened. The bore can be sleeved down to fit smaller diameter



spindles or it can be bored to fit spindles up to 3.25 in. in diameter.

Lapped diamonds are not necessary. The company says any diamond shape or size is suitable as long as it enters the form being dressed. In addition to dressing intricate contours, the dresser can be used also for straights, angles, and steps.

For further information, *write* Tracaform Corp., 11380 Kaltz Ave., Warren, Mich.

Small Tool Furnace Can Treat High Speed Steels

A SMALL tool furnace can give users the advantages of a complete, full scale heat treating department at a comparatively low price, says the maker.

It features a temperature range broad enough for treatment of high speed steels, including the cobalt type. Tools, dies, and small production parts (both oil and water hardening steel) can be heated, quenched, and drawn. The furnace can also be used for stress relieving, normalizing, and annealing under controlled atmospheres.

The complete unit has three furnaces. Each has inside dimensions of 16 x 14 x 8 in. The preheat furnace reaches a maximum of 1850° F. The drawing furnace is a recirculating air type to permit close temperature control in the lower ranges. Maximum temperature: 1200° F.

The high temperature furnace has Globar heating elements and a transformer. Maximum temperature is 2400° F. Two quench tanks (one for water and one for oil) are used. All separate sections are mounted on casters for flexibile arrangement.

For further information, *write* Dept. 9, Waltz Furnace Co. 1901 Symmes St., Cincinnati 6, Ohio.

Unit Slices Sections Fast, Produces Fine Finishes

SURFACE FINISHES finer than 100 rsm (root square measurement) are claimed to be common with the 2100 series Cut-Machining unit. It's set up to cut an 8 in. steel I-beam (18.4 lb per foot) in less than 18 seconds and a 20 in. I-beam (65.4 lb per foot) in less than 65 seconds.

The maker says the unit can cut any section that can fit into a box 6 x 24 in. It can cut a 3 x 24 in.

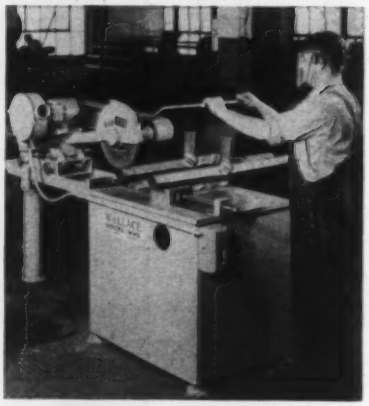


plate or 72 sq in. in just about 4 minutes. Materials such as copper, brass, and aluminum can be cut at faster rates.

For further information, *write* Wallace Supplies Mfg. Co., 1300 Diversey Parkway, Chicago 14, Ill.

Vibratory Finishing Unit Handles Small Parts

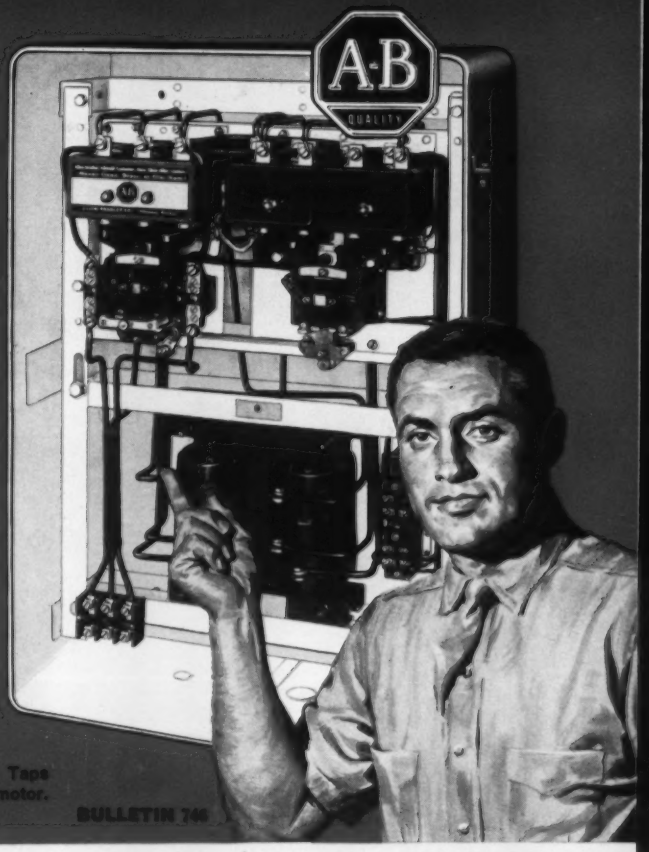
A COMPACT, self-contained vibratory finishing machine with a work container capacity of 1½ cu ft has been designed as a production unit for finishing small parts.

The unit (designated 1½ YA) is suitable for metal, plastic, and ceramic parts. The machine features a conveniently located mechanical motion control for infinite variation of frequency over the

Where Reduced Voltage Motor Starting is Necessary...

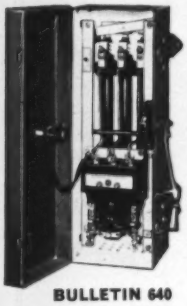
Allen-Bradley has the best and most complete answer

No matter what your reason for reduced voltage motor starting may be, Allen-Bradley has the *right* starter. Not only can the power company's requirements be satisfied exactly, but the A-B starter will at the same time provide the best possible starting conditions for the motor and the driven load. At least one of the starters described below will completely satisfy your operating requirements. For more detailed information, send for Publication 6088.



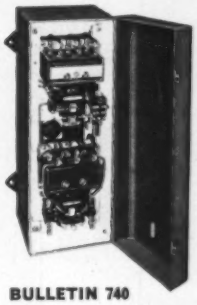
AUTOMATIC AUTOTRANSFORMER starter for squirrel cage motors that should not be started at full voltage. The autotransformer reduces line voltage during acceleration. Taps permit adjustment of voltage applied to the motor.

BULLETIN 746



MANUAL STEPLESS RESISTANCE starter has graphite compression disc resistors for velvet smooth starting of squirrel cage motors. Starting of the motor is under the complete control of the operator.

BULLETIN 640



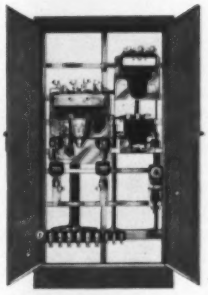
AUTOMATIC RESISTANCE starter has graphite resistors automatically inserted in series with the squirrel cage motor at starting. Resistors can easily be adjusted to motor and load conditions, giving velvet smooth acceleration.

BULLETIN 740

MANUAL AUTOTRANSFORMER starter for use where load conditions or power company rules require reduced voltage starting. The air break starter shown has double break, silver alloy contacts.

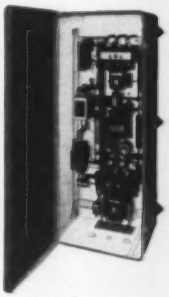
BULLETIN 648

AUTOMATIC MULTIPOINT RESISTANCE starter for use on network systems. Resistors inserted at starting are cut out in definite steps. Time intervals adjustable to provide velvet smooth starting.



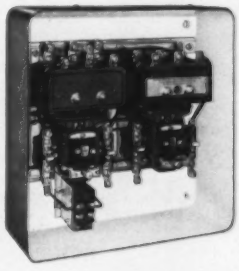
BULLETIN 741

AUTOMATIC STEPLESS RESISTANCE starter is not equalled for velvet smooth motor acceleration. It will satisfy any power company requirement. Eliminates lamp flicker on networks used for power and lighting.



BULLETIN 742

AUTOMATIC PART WINDING starter for use with squirrel cage motors having two separate parallel windings. Made in two-step type, and three-step type with resistance connected in the line on the first step.



BULLETIN 736

3-61-RM

ALLEN-BRADLEY

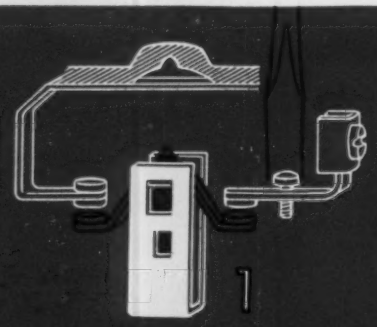
Member of NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

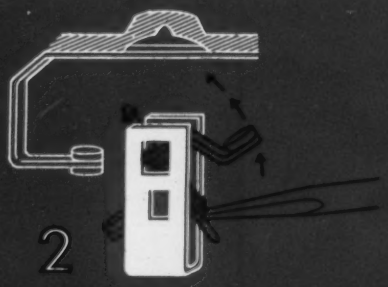
QUALITY MOTOR CONTROL

Four simple steps to contact changeover

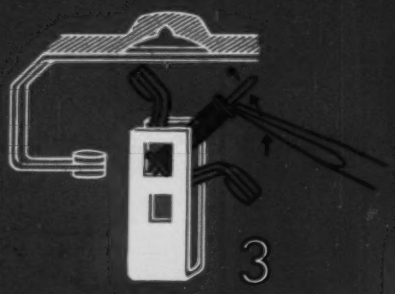
Total time—not more than 60 seconds



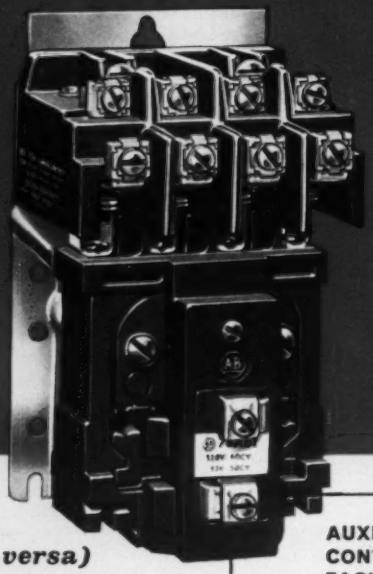
REMOVE FRONT STATIONARY TERMINAL

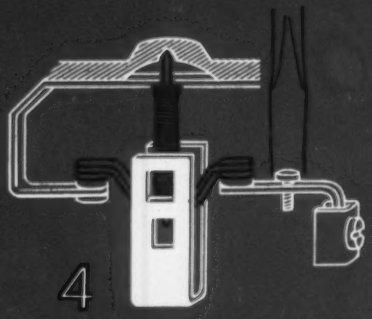


LIFT CONTACT SPRING AND ROTATE



DEPRESS SPRING AND TURN PIN STRAIGHT UP





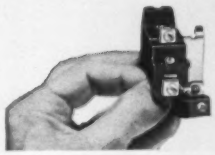
REPLACE TERMINAL IN REVERSE DIRECTION

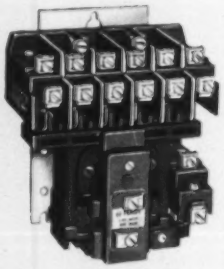
Converts from N.O. to N.C. (or vice versa) in 60 SECONDS!

You'll be truly amazed at the ease of converting the contacts on these Allen-Bradley Bulletin 700 Type BR relays. Using only a screwdriver, as shown above, the contacts can be changed from N.O. to N.C. (or vice versa) in four easy steps—that take only *60 seconds!* Such convenient flexibility is a "natural" for reducing relay inventories.

The Type BR relays are built to provide *many millions* of trouble free operations. With the built-in permanent air gap, magnetic sticking is impossible. And the molded coil is impervious to *all* harmful atmospheres. Of course, the double break, silver contacts *never* need attention. If you use relays, there are money savings for you in the Type BR relay line!

AUXILIARY CONTACTS EASILY ADDED





Type BR relays are available with 2, 3, 4, or 6 poles—but as a valuable bonus, one or two fully rated poles can be added to the base of each relay—even in the field. It's a simple addition that takes only moments.

ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

QUALITY MOTOR CONTROL

3-61-RM

available range while the unit is running.

The rubber lined work container holds up to 500 lb of media and work and is supported by a system of air cushions. Amplitude and frequency are variable.

The finisher may be operated in buildings where structural limitations prohibit conventional spring mounted units. When placed on air cushioned floor mounts, no vibration is transmitted to the floor.

For further information, *write* Vibratory Finishing Div., Pangborn Corp., Hagerstown, Md.

Inert Gas Welders Are All Purpose Types

TWO, all purpose, inert gas shielded, arcwelding machines have been announced by Hobart. Model ADI-2641 is rated at 200 amperes and Model ADI-3641 is rated at 300 amperes.

By changing a switch, or by the use of plug-in controls and accessories, they can be used for manual, automatic, tungsten inert gas, inert gas spot, or gas shielded arc, consumable electrode welding.

Both models have broad welding ranges which permit welding with as little as 1 ampere of welding current. Model ADI-2641 has a welding range of 1 to 300 amperes ac or 1 to 350 amperes dc. Model ADI-

cadco®

Bunting® NYLON

An additional Bunting service

NOW available from Bunting distributors all over America

Bunting nylon puts at the disposal of engineer and manufacturer a tested material for bearings and parts that fully meets all requirements in which the unique qualities of nylon are desired. It is strong, tough, heat resistant, rigid but with high embeddability, and practically self-lubricating. There are many and various applications where Bunting nylon will improve performance.

- Bunting nylon is available from stock in solid rods, extruded tubes, tubular bars, pressure tubing and plate.
- Unusually wide range of sizes and shapes provides low cost fabrication and minimum of machining.
- It is readily machined, blanked, ground, turned and welded or bonded with adhesive. High production speeds can be maintained.

Bunting nylon expands Bunting's comprehensive service —now supplying bearings, parts and bars made of cast bronze, sintered metals, aluminum and nylon. Available from stock or made to blueprint for production and maintenance requirements.

MACHINE SHOP SERVICE

Small lots of bearings, or parts made of Bunting Nylon, Cast Bronze, Sintered Bronze, or Aluminum can be made immediately at low cost by fully equipped emergency machine shops in Bunting branches. The wide range of sizes of Bunting Stock bearings, bars and Nylon shapes makes the alteration of a stock item easy and economical. Your local Bunting Distributor can arrange for such work.

- Write for Nylon Catalog No. 32. Nylon Technical Brochure No. 33.
- See our new complete General Catalog No. 61 in Sweet's Product Design File $\frac{11c}{Bu}$ or write for a copy.

The BUNTING Brass and Bronze Co., TOLEDO 1, OHIO

BEARINGS, BUSHINGS, BARS AND SPECIAL PARTS OF CAST BRONZE, SINTERED METALS, ALUMINUM AND NYLON

Are Small Precision Metal Parts Getting In Your Hair?

If you need precision in small metal parts you can get it from Torrington—plus exactly the right finish, temper and hardness required for your needs. Moreover, Torrington can produce such parts at high speed and a remarkably economical cost. We are the leading specialist in this field—with the specialized skills, engineering experience and facilities to save you money. If you have small parts to be manufactured in large quantities why not let Torrington solve your entire problem. Let us hear from you and your request will receive prompt action.

progress through precision **SPECIAL METAL PARTS**

THE TORRINGTON COMPANY Torrington, Conn.

NEW PRODUCTS and equipment

3641 has a welding range of 1 to 375 amperes ac or 1 to 410 amperes dc.

Inert gas facilities are built in and a hinged top permits easy access to spark gap and timers of the high frequency stabilizer. Welding cables for Tig and metal arcwelding are permanently connected. The operator flips a switch to choose between the two welding methods. Both units operate from single phase, 230/460 ac power.

For further information, *write* Hobart Bros. Co., Troy, Ohio.

Assembly Tool Combines Press, Stake, Eject Cycle

THE PRESS, stake, eject cycle is combined in a high speed, fully automatic assembly tool now available from Cramer Controls Corp.

Independent pressing and staking forces adjust from a light tap up to 1 ton. An automatic, adjustable ejector removes finished assemblies. Standard interchangeable tooling fits the removable C holder die set which adapts to a wide variety of assembly operations, and the lower part of the machine fits into a workbench for an easy working height.

For further information, *write* Machine Tool Div. Cramer Controls Corp., Centerbrook, Conn.

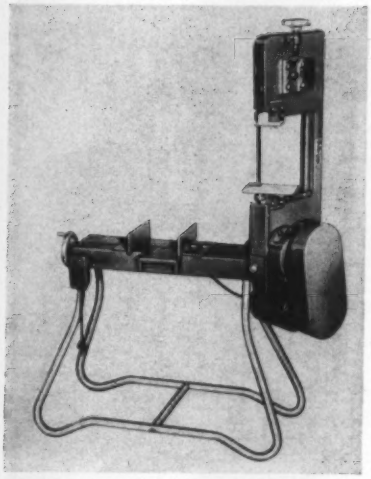
Metal Bandsaw Cuts Horizontally, Vertically

YOU CAN use the Wells Model 300 saw as a horizontal cutoff unit or as an upright band type for cutting angles, slots, notches, and bevels.

Maximum horizontal cutting capacity is 3½ x 6 in. for rectangular shapes and 3½ in. diameters (3 in. pipe) for rounds.

It's powered by a ¼ hp, 115 volt motor with a V-belt drive. Blade speeds of 54, 100, and 190 fpm are standard. A positive screw action vise holds stock for horizontal cutoff work. A switch automatically shuts off the machine at the end of a cut. Overload protection is provided.

The frame unit is equipped with



a 4 x 6 in. integral worktable. Throat height is 7 in. and throat depth is 6 in. Floor space requirements are 16½ x 38½ in. The bed measures 6½ x 24 in.

For further information, *write* Wells Mfg. Corp., 1515 Fillmore St., Three Rivers, Mich.

Water Soluble Base Aids Aluminum Machining

A BASE to sink aluminum chips and prevent caking of aluminum fines in machining and grinding operations has been developed. It's said to increase grinding wheel life up to 40 per cent in some cases (by replacing conventional oils).

The base (listed as No. 505) makes a stable white emulsion in water and has high resistance to bacterial growth.

For further information, *write* Baker/Gubbins Co., 1448 Wabash Ave., Detroit 16, Mich.

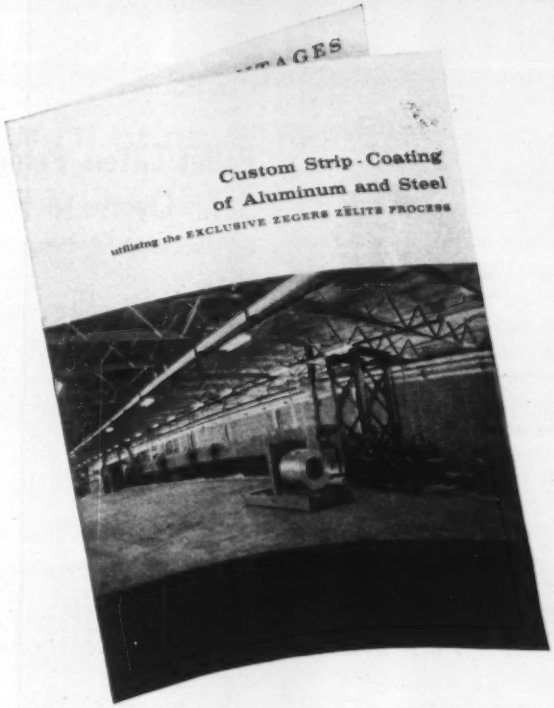
Radial Drilling Machine Bores Holes 22 in. Deep

A PRECISION radial drilling machine (5 to 10 hp) has been designed to fill the gap between sensitive upright and large radial drills.

The manufacturer says it outperforms other units in its class where quantity and variety of holes are to be drilled or tapped. The radial drill column is supported in a housing that provides bearing support and added rigidity.

The radial arm or ram can be

Get this important NEW STRIP-COATING FOLDER by ZEGERS



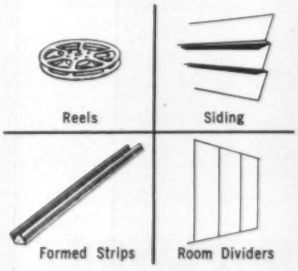
READ ABOUT THE NEW PROCESS

Zegers Zēlite gives steel and aluminum strip the finest protection and decoration—won't mar when stamped, formed, or drawn. Beautiful luster and richness—clear or colored—resists abrasion, corrosion, acid, salt . . . won't craze, crack, or discolor. Coating selections include: vinyls, alkyds, epoxies, acyrlics, plastisols, organisols.

. . . and ABOUT THE NEW PLANT

Conveniently located at Peotone, Illinois (near Chicago)—completely equipped throughout with latest facilities . . . most modern strip-coating operation in the industry. Continuous coating and slitting for uniformity and economy. Experienced staff of engineers for consultation and recommendations. On-schedule shipments.

UNLIMITED APPLICATIONS . . . SUCH AS . . .



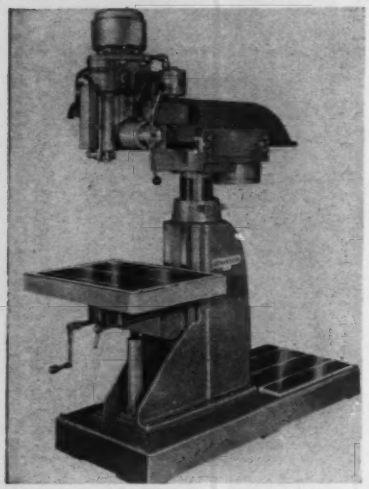
Window Frames • Sash and Screens
Gutters • Venetian Blinds
Oil Filter Cartridges • Trays • Roofing
Awnings • Gutters and Downspouts

Mail coupon

ZEGERS
INCORPORATED, ZĒLITE DIVISION
8090 South Chicago Ave., Chicago 17, Illinois

Please send new folder describing exclusive Zegers Zēlite and Zēlite strip-coating service.

Individual _____ Title _____
Company _____
Street _____
City _____ Zone _____ State _____



obtained in 3 or 4 ft lengths. It swings through 360 degrees for positioning at any location over the 20 x 40 in. worktable at the front of the machine or over the 25 x 42 in. work platform at the rear of the machine when taller or heavier pieces are to be drilled.

The unit has column and ram power locks. When the operator locates the drill, column rotation and movement are locked simultaneously and instantly by pressing a button that actuates the electromechanical lock.

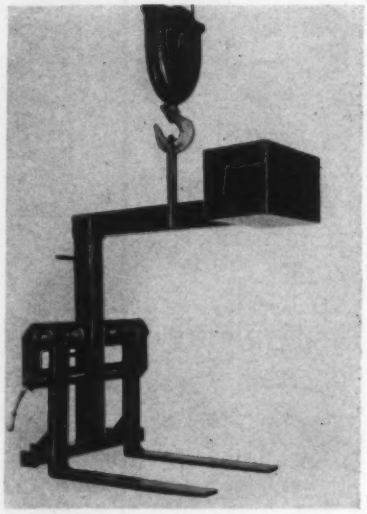
With the column locked from rotating, it can be moved up or down 12 in. in column housing (giving a 54 in. maximum, 6 in. minimum from spindle to work surface without losing the drill location).

For further information, *write* I. O. Johansson Co., Skokie, Ill.

Pallet Lifters Permit Safe, Overhead Handling

OVERHEAD handling of palletized loads with the C-F pallet lifters is fast and safe. The adjustable fork permits handling a wide range of pallet sizes and enables forks to be positioned at a precise point under a specific load.

Both forged forks can be simultaneously moved inward or outward

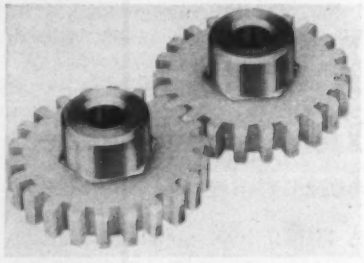


by a heavy duty screw. Adjustable fork lifters are made in capacities starting at 4000 lb. Fixed fork lifters can be made in any capacity or size.

For further information, *write* Cullen-Friestedt Co., 1300 S. Kilbourn, Chicago 23, Ill.

Cut Nylon Gears Have Metal Insert Hubs

PRECISION, nylon cut gears with molded metal insert hubs made by Climax are called the Nymet line. You can get cut tooth gears up to 3 in. OD with up to a ½ in. face in any quantity without tool charge. The gears are available in 48, 32, 24, 20, 16, and 12 pitch and in 14½ and 20 degree pressure angles.



A hexagonal metal hub (Hexlok) is inserted when the gear blanks are molded. The hub is locked radially by its hex shape and axially by a channel cut around the hexagonal face. The design resists shock, torsion, and vibration.

For further information, *write* Climax Metal Products Co., 863 E. 140th St., Cleveland 10, Ohio.

WHEN YOU NEED HELP IN A HURRY—

Koppers coupling service cuts costly down-time

Not every coupling service need is an emergency. But it's the emergencies that really test a good organization. That's why Koppers maintains experienced field engineers and outstanding stock facilities throughout the country. In addition, if it's a Fast's Coupling you're replacing, we have a serial number and specific application history for every Fast's for easy reordering. And our modern manufacturing facilities have the extra capacity to lick an emergency for special requirements.

Example: A modern windowless bank in Georgia was able to open for business as usual only because Koppers flew in a completed replacement coupling for its air conditioning unit. Elapsed time . . . request phoned to Baltimore after 10 in the evening . . . coupling arrived before 7:30 next morning.

KOPPERS COMPANY, INC., 301 Scott St., Baltimore 3, Md.

KOPPERS

FAST'S COUPLINGS

Engineered Products Sold with Service

NEW literature

Write directly to the company for a copy

Lead-Lithium Alloys

A bibliography on lead-lithium alloys summarizes the data obtained in investigations over the last three decades. Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.

Welding Flame Comparison

Two wall charts show the distinctive traits of oxy-LP gas flame in comparison with the oxyacetylene flame. The charts measure 11 x 17 in. Public Relations Dept., Smith Welding Equipment Corp., 2633 S. E. Fourth St., Minneapolis 14, Minn.

Steel Specifications

"Specification for Architecturally Exposed Structural Steel" and "Standard Specifications and Loading Table—Open Web Steel Joists (Longspan or L-Series)" have been released by the AISC. American Institute of Steel Construction Inc., 101 Park Ave., New York 17, N. Y. (or any regional office).

Cerium in Ductile Iron

A bibliography, "Uses of Cerium (Mischmetal) in Ductile Iron Production," contains 27 recent references to the application of cerium in Ductile Iron making. Cerium Metals & Alloys Div., Ronson Metals Corp., 45-55 Manufacturers Place, Newark 5, N. J.

Steel Bonded Carbide Tools

"Some Properties and Metallography of Steel Bonded Titanium Carbide" is illustrated with a series of tables and graphs covering hardness range, physical properties, tempering, and TiC concentration. Sintercast Div., Chromalloy Corp., 171 Western Highway, West Nyack, N. Y.

Screw Feeding Equipment

Tested performance of screw feeding equipment for 456 different dry materials from abrasives to zinc stearate is described in an eight page folder. Vibra Screw Feeders Inc., 156 Huron Ave., Clifton, N. J.

Shear Blades and Knives

An 83 page manual describes every type of shear blade and knife used in metalworking. Wapakoneta Machine Co., Wapakoneta, Ohio.

Material Handling Ideas

"Handbook of Cost Cutting Materials Handling Ideas," 80 pages, discusses current material handling problems and tells how to select the right truck for the job and how to analyze material handling in your plant. It includes flow charts, truck battery calculator charts, and proven cost cutting truck applications. Automatic Transportation Co., 149 W. 87th St., Chicago 20, Ill.

We'll bring STRIPPIT's cost-cutting demonstration to you

Here's the newest STRIPPIT Mobile Demonstrator Unit, equipped with actual operating STRIPPIT metalworking equipment. Every day, throughout industrial America, we welcome aboard scores of production men and company executives for on-the-job proof that the STRIPPIT way is the most efficient and economical way to punch holes.

These men (center) are watching the STRIPPIT Super 30 Fabricator in action, punching out a complex hole pattern from a template mounted on the integral Duplicator. Time studies conducted in customer's plants have shown savings in production time of 60% to 80% over conventional methods.

The STRIPPIT Flex-O-Drill (bottom) eliminates the need for base line drawings and vernier height gage layouts in the production of precision templates and sheet metal layouts. Also on display in the Demonstrator are a variety of STRIPPIT self-contained hole punching units.

One of these Mobile Units is in your part of the country now. Write or call Wales STRIPPIT and ask them to put your plant on the itinerary.

WALES **STRIPPIT** INC.

A UNIT OF HOUDAILLE INDUSTRIES, INC.

210 Buell Road • Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario

Cooked to order

... precisely

Special service, personal attention to *every* order, regardless of size ... that is *precisely* the SEAWAY STEEL policy.

The flexibility of our rolling schedules enables us to produce any size rod or bar to your specifications ... and under normal conditions, *produce it faster.*

SPECIAL ANALYSIS
SPECIAL SURFACE FINISHES
SPECIAL HARDNESS
SPECIAL HEAT TREATING

SEAWAY STEEL craftsmen have worked together for decades producing quality bars and rods for the Fastener and Forging trades. Our vast experience and knowledge of the requirements for Cold Heading Quality Bars and Nut Formations is at your disposal.

Ask us about a delivery date on your next order.

NX 3-9700

SEAWAY STEEL CORPORATION

101 EAST AVENUE • NORTH TONAWANDA, NEW YORK

Dormant Markets Waking Up

DESPITE BIGGER than expected cutbacks in the auto industry, steelmakers are happier today than they have been in several weeks. Reasons: January shipments are running well ahead of December's, and there are signs of life in markets that have long been dormant.

Specifically, oil companies are buying more seamless tubing—apparently because their stocks are abnormally low. (Inventory liquidation started earlier in oil country goods than in most other products.) Can companies, following the normal seasonal trend, are ordering more tin plate than they took in December.

OUTPUT UP SLIGHTLY—To meet the needs of customers who have stepped up their buying, steelmakers are boosting their output to a slightly higher level. STEEL estimates that ingot production in the week ended Jan. 14 rose 2.8 per cent to 1.4 million net tons from the 1,361,000 tons reported for the preceding week. In part, the higher production reflects efforts by some mills to replenish semifinished stocks. Some of STEEL's sources think that production will level off this week.

AUTOMAKERS CUT—To a degree, steelmen anticipated the curtailments coming out of motordom, but it now appears that the cutbacks will be more severe than originally thought. January output may not exceed 425,000 cars (vs. 522,000 in December). First quarter output will probably be about 1.4 million vs. 1.7 million in the fourth quarter. Reason: New car inventories stood at 998,500 units on Jan. 1.

ORDERS PUSHED BACK—As they adjust their production schedules to sales, automakers are pushing some of their January steel into February and, as a result, placing fewer new orders than the steel companies expected. This may hold any increases in late January to a minimum because other industries have not fully taken up the slack. But, productionwise, it means that February could be about as good as January.

STOCKS STILL SHRINKING—With steelmakers producing and shipping only about half as much metal as they could turn out at capacity, it's clear that inventory liquidation hasn't ended. Consumers are believed to be consuming steel at a rate equivalent to a little under 60 per cent of the industry's shipping capacity.

END APPROACHING—First quarter shipments are expected to be about 14.8 million tons—4.8 million in January, 4.8 million in February, and 5.2 million in March. Users may consume about 16.5 million tons. If they do—and assuming that exports and imports in the first quarter will be roughly in balance—consumers will have to take about 1.7 million tons from inventory. That will reduce their stocks from the estimated Jan. 1 level of 10 million tons to only 8.3 million tons.

It's doubtful that stocks can be cut that low, which means that: 1. Inventories were higher on Jan. 1 than anybody figured. 2. Or current consumption is below estimates—closer to 50 per cent than to 60 per cent of shipment capacity. 3. Or inventory and consumption estimates are correct, but users will stop liquidating stocks by mid-February and thereafter buy as much steel as they use—or start to rebuild stocks.

SPOTLIGHT ON HOUSING—If steel demand is to improve in the spring, as most marketing men predict, housing starts will have to pick up. In the fall, automotive demand and housing were the mainstays of the market. Now, with autos faltering, the importance of residential building looms larger. Since vacancies are high, there may be a need to spur building via lower interest rates.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	131	114
Reinforcing	...	115
Boiler Tubes	...	119
Canada	...	122
Charts:		
Finished Steel	...	113
Ingot Rate	112	...
Scrap Prices	...	125
Clad Steel	...	120
Coal Chemicals	...	122
Coke	...	122
Comparisons	...	113
Contracts Placed	132	...
Contracts Pend.	132	...
Electrodes	...	*
Fasteners	...	119
Ferroalloys	...	*
Fluorspar	...	122
Footnotes	...	119
Imported Steel	...	122
Ingot Production	112	...
Metal Powder	...	122
Nonferrous Met.	128	130
Ores	...	122
Pig Iron	125	121
Piling	...	114
Plates	111	114
Plating Material	...	131
Prestressed Strand	...	119
Price Indexes	...	113
Producers' Key	115	...
R.R. Materials	...	119
Refractories	...	122
Scrap	124	126
Semifinished	...	114
Service Centers	111	121
Sheets	111	115
Silicon Steel	...	116
Stainless Steel	111	120
Strip	111	116
Structurals	131	114
Tin Mill Prod.	111	116
Tool Steel	...	120
Tubular Goods	...	120
Wire	112	116

*Current prices were published in the Jan. 9 issue and will appear in subsequent issues.

HOW WESTERN PRECIPITATION'S UNIQUE "KNOW-HOW" BENEFITS YOU!

The science of dust, fume and fly ash recovery is a highly technical one. Moreover, the fact that there are a number of basic methods for separating suspensions from industrial gas streams – each with certain advantages and disadvantages – further complicates the basic problem.

Even two different plants cleaning the same type of gas may find that such variables as capital investment policies, maintenance and labor schedules, and other similar management functions may make one type of equipment the logical choice for one plant – a basically different type of equipment the best solution for the other.

That's why Western Precipitation's position in the gas cleaning field is so unique. It is the *only* organization that designs, engineers and installs *all* the basic types of gas-cleaning equipment. It is completely unbiased in its viewpoint, and is able to show you exactly how the overall costs, the collection efficiencies and the operating requirements will vary for each installation – with each type of collecting equipment that may be applicable.

Such an unbiased evaluation is invaluable in assuring optimum returns from your gas-cleaning dollar. Best of all, this unique "know-how" costs you nothing. It is a basic part of Western Precipitation's service to industry throughout the United States, Canada and the Free World.

Our nearest representative will gladly place this unique fund of experience at your service. Why not call him today?

G-190

WESTERN
PRECIPITATION
DIVISION OF JOY MANUFACTURING COMPANY
1000 WEST 9TH STREET LOS ANGELES 54, CALIFORNIA
NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4
IN CANADA: 8285 MOUNTAIN SIGHTS AVENUE, MONTREAL, P. Q.

Cottrell Precipitators	Multiclone Dust Collectors	Therm-O-Flex Hi-Temp Filters	Dualaire Reverse-Jet Filters	Turbulaire-Doyle Scrubbers	Joy Microdyne Scrubbers	Combination Units	Holo-Flite Processors	Hi-Turbiant Heaters

'FROSTPROOF' Steels Invade Hot Markets

Type	Tensile Strength (psi)	Allowable Stress (ASME)	Price* (Cents per pound)	Lowest Test Temperature	Where It's Used
A-201, Grade B	60,000 to 72,000	15,000	7.7	−50°F	Welded pressure vessels and storage tanks, when weight and strength aren't critical. Refrigeration; transport equipment.
A-212, Grade B	70,000 to 85,000	17,500	7.7	−50°F	Same as above.
"T-1"	115,000 to 135,000	28,750	13.5	−50°F	Highly stressed pressure vessels. Tank trucks for hauling LP gases.
A-203, Grade B (2¼% Nickel)	70,000	17,500	13.8	−75°F	Tanks, vessels, and piping for liquid propane.
A-203, Grade D (3½% Nickel)	65,000	16,250	14.7	−150°F	Land based storage of liquid propane, carbon dioxide, acetylene, and ethane.
A-353, Grade A (9% Nickel)	90,000	22,500	30.2	−320°F	Large tonnage oxygen producing equipment. Transportation and storage of liquid ethylene, methane, oxygen, and nitrogen.
A-240 (Type 304 Stainless)	75,000	18,750	45.7	−452°F	In petrochemical, nuclear, missile, and other areas where purity of product is essential. Hauling liquid hydrogen rocket fuel.

*Approximate prices based on firebox quality ASTM A-300.

Steelmen Set for Cryogenics Battle

CRYOGENICS business has doubled in the last five years—mainly because of increased industrial and military consumption of liquefied gases. And it may double again in the next five years. The outlook adds up to a need for bigger tonnages of steels that can retain their toughness at low temperatures.

• **Many Uses**—Oxygen, nitrogen, hydrogen, and other gases are being liquefied for economy, convenience, and safety in transportation and storage. Savings in container space are enormous. For oxygen and hydrogen, the ratio of liquid volume to gas volume is 850 to 1.

And that's just part of the story. Low temperature processes are proliferating at an amazing rate. Oxygen and nitrogen have become indispensable in the missile, atomic energy, and metal producing industries. Oxygen may soon be applied to copper production. Separation of organic chemicals at low temperatures has just begun. Air liquefaction plants are multiplying.

• **Products**—The most commonly used steels for low temperature applications (−28 to −160° F) are ASTM A-201 and A-212 (carbon types), 2¼ per cent nickel steel, and 3½ per cent nickel steel. They're suitable for cold climate structural purposes and for handling liquefied gases such as propane, carbon dioxide, acetylene, and ethane. For high strength, con-

structional alloy steels such as U. S. Steel Corp.'s "T-1" are favored at temperatures above −50° F.

In the cryogenic field (−296 to −459° F), there are two choices—9 per cent nickel steel and the austenitic stainless steels (Types 304 and 304L). They're used principally in handling liquid methane, oxygen, argon, and nitrogen. Stainless alone is used for hydrogen (boiling point −423° F).

• **Battling Aluminum**—If steelmen have one white hope in their battle with aluminum and other nonferrous metals, it's 9 per cent nickel—a grade that resists brittle fracture at temperatures as low as −320° F. Although it's not new (International Nickel Co. patented it in 1948), it has been available in commercial quantities for only two years. Selling points: 1. It is priced at 30 to 35 cents a pound—little more than half the cost of cryogenic aluminum or 304 stainless (with extras). 2. Its greater strength permits designing to higher stresses.

Some steel sales executives are predicting that 9 per cent nickel will recapture from aluminum as much of the industrial cryogenic market as the light metal took from stainless. But they're not forecasting much success in the missile and rocket field. Reason: Defense planners are sold on stainless for keeping fuel lines clean.

• **Availability**—Nine per cent nickel steel is furnished in plates, forgings, semifinished, and a full range of bar sizes. It's also available in the most common seamless pipe sizes, as well as hot rolled and cold drawn seamless tubing up to 10¾ in. OD. Sheets and structurals can be obtained on inquiry.

• **Big Markets**—Biggest users of 9 per cent nickel steel in the near term will undoubtedly be fabricators of equipment for production, transportation, and storage of liquid oxygen. The steel industry, biggest oxygen consumer, is expected to at least double its consumption in the next five years.

In the speculative area, there's a possibility that petroleum producers will liquefy methane and ship it from the oil fields of South America and the Near East (where it's a waste product) to the United Kingdom, Europe, and Japan—which are short of natural fuel. Up to 3000 tons of 9 per cent nickel steel might be needed for each ship's container section.

• **Needed: New Specs**—The outlook for 9 per cent nickel steel would be even brighter, producers believe, if code bodies would: 1. Approve its use in the quenched and tempered state for welded tanks and pressure vessels slated for service at temperatures down to −320° F. 2. Approve the use of as-welded (not stress relieved) tanks and pressure vessels.

Last October, three firms—International Nickel Co., Chicago Bridge & Iron Co., and U. S. Steel Corp.—invited code body representatives to Fairless Hills, Pa., for a demonstration. Tests showed that quenched and tempered 9 per cent nickel steel can take pressure and impact loading at −320° F without stress relief after welding.

ERIE
BOLTS • STUDS
CAP SCREWS • NUTS
IN ALLOYS
STAINLESS
CARBON
BRONZE
THE CORRECT FASTENER FOR THE JOB . . .
It will pay you desirable dividends in satisfactory results to place your fastener specifications in the hands of specialists. For nearly a half century we have furnished widely diverse industries with fasteners to meet the rigors of extreme temperatures, corrosion, tensiles, fatigue, impact and shear stresses. Send us your specifications for prompt estimate.
This bolt is made special for Oil Refinery Return Bends.
A SUBSIDIARY OF
RIC
ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives in Principal Cities

Wheeling Steel Enters Thin Tin Plate Market

Wheeling Steel Corp., Wheeling, W. Va., will begin commercial production of lightweight, tin plated steel in March or April. The product is designed to meet competition from other materials in the container field. At least two other steel firms are producing thin tin plate, and several others have plans to enter that market.

W. A. Steele, president, says the product will be rolled at Wheeling's Yorkville (Ohio) Works and will be available in base weights of 55 lb and 60 lb per base box. It will be sold in both coil and sheet form.

The base prices for the thin tin plate will be $6.40 a base box for 55 lb metal, $6.55 for 60 lb metal, f.o.b. Yorkville, Ohio.

Price Cut 10 Per Cent on Type 422 Stainless Steel

A price reduction of 10 per cent on Type 422 stainless steel was announced last week by Crucible Steel Co. of America, Pittsburgh. The company now quotes: bars 59 cents per pound; wire 56 cents; plates 61 cents; sheets and strip 74.25 cents; billets 54.75 cents.

Type 422 is a hardenable heat resistant steel specialty used for high stress parts, such as turbine and compressor blades. It contains 12 per cent chromium, 1 per cent tungsten, 1 per cent molybdenum, 0.80 per cent nickel, and 0.75 per cent manganese.

Stainless Steel . . .

Stainless Steel Prices, Page 102

Orders for stainless steel spurted in early December, then trailed off at the end of the month. Despite the yearend slowdown, December bookings exceeded November's. The outlook is for continued, though modest, improvement this month.

It's hoped that service centers and other buyers which deliberately held down their yearend inventories for tax reasons will revert to a policy of buying as much steel as they're using. There will have to be an upturn in consumption before there's any marked improvement in sales of stainless. Users have no incentive to increase their inventories because the mills are promising them overnight delivery of standard sheets and strip.

Plates . . .

Plate Prices, Page 114

Interest in plates centers mainly on specialties, such as heads and flanges for the oil and chemical industries. Alloy plates are moving better than carbon plates. Deliveries on both sheared and universal carbon plates can be had within ten days to two weeks; on alloy plates, three to five weeks.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 115 & 116

Flat rolled steel is still in greater demand than any other product. Auto requirements are disappointing, but there is a diversity of other stamping work which accounts for a fairly substantial tonnage.

Orders are for nearby shipment and will likely continue as long as producers are in position to make them. Most mills can ship hot rolled sheets within two to three weeks, cold rolled, in two to five weeks; enameling stock, two weeks; and electrical sheets, three to four weeks.

Consumers continue to draw on stocks for some of their needs, but the practice is slowing down.

Distributors . . .

Prices, Page 121

Steel service centers anticipate a pickup in bookings, but they report business is far from brisk. Sheets are in best demand, although prices are weakened by mill offerings of secondary grades.

Distributors are maintaining normal inventories and are able to replenish them on fairly prompt deliveries from mills (three weeks or less on most items).

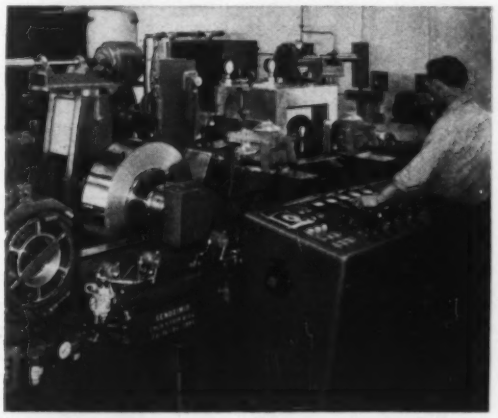
Service center officials in the Seattle area report a slight upturn in sales volume this month. The over-all situation remains slow, but a gradual improvement is expected.

A major distributor in the Houston district says that one large European firm is passing the word that prices are likely to advance.

SUPER ALLOYS...

SPECIAL METALS...

SPECIAL RUSH!!!



Ferrous, nickel and super alloys plus special metals in coil form are all stocked in quantity at Ulbrich. Coils in gauges down to .001 all tempers and other specific requirements. Weights from 1 ounce to 2,000 pounds or more. Write for complete Ulbrich stock list on special metals and super alloys plus stainless steel strip.

Contact your local stainless steel service center for Ulbrich fast service and delivery.

SINCE 1924 Ulbrich "the biggest little mill in the country"

WRITE, WIRE OR PHONE
ULBRICH STAINLESS STEELS
WALLINGFORD, CONNECTICUT
TWX 277 Phone COlony 9-1434

partly because of increased demand in other countries and partly because of increased tensions in Laos and Cuba.

Wire . . .

Wire Prices, Pages 116 & 119

Buying interest in domestic wire products is slow, partly reflecting strong competition from importers. Manufacturers' wire can be had within two to four weeks; merchant wire, from stock.

Industrial quality and special wire products are in the strongest demand from mills in the Los Angeles district. Concrete reinforcement wire and wall mesh sales reflect continued active demand from the construction industry. Bookings so far in January are reported to be good. December sales were higher than expected but still 5 to 10 per cent below the November total.

Steelmaking Operations Continue to Increase

Mills continue to step up operations. Part of the gain is attributed to recovery from the holiday slowdown and, more importantly, to an increase in orders from practically all consuming industries with the exception of automotive. Cutbacks in auto assemblies are reflected in cancellations or postponed delivery dates on some orders.

STEEL estimates ingot production for the week ended Jan. 14 at 1.4 million tons, an increase of 2.1 per cent over the preceding week when 1,361,000 tons were produced. The immediate trend continues upward.

The industry operated at an index figure of 73.1 (1957-59 equals 100) for the week ended Jan. 7 against 59.2 for the week ended Dec. 31.

• **Youngstown**—Steelmakers are increasing ingot production to fill orders and accumulate reserve stocks. A stepup in operations at the Campbell Works of Youngstown Sheet & Tube Co. is partly in preparation for a changeover in finishing facilities later this winter. The company plans to resume production on a rebuilt, 79 in. hot strip mill by early spring and to make changes on some other facilities, such as equipping the blooming mill to roll larger slabs. Finishing equipment is expected to be idle for two or three weeks in February while changes are being made. The company apparently plans to roll a large inventory of sheets and strip to allow it to fill orders during the period. Some of the furnaces now being relit may be shut down again while the work is underway.

• **Birmingham** — Production has risen to the highest level since November and is expected to level off at this comparatively high rate. Operations here are somewhat above the national average.

• **Buffalo** — Steel mill operations have improved a little, attaining the preholiday level. The order pattern is following the expected trend—a slight gain in some products, but nothing to get excited about. Mills expect to be able to handle the new business without much of a stepup in production, especially since they have a fair amount of ingots in reserve.

• **Philadelphia**—Steelmaking operations are tending upward as producers move to bolster stocks of semifinished products which declined during the holiday curtailments.

• **Cincinnati**—Operations at district mills vary widely. Some producers are curtailing production, and others are gaining. Output is holding fairly steady, and the trend over the next few weeks is expected to be upward.

• **Chicago**—Ingot production is expected to improve this week, reflecting a modest upturn in demand for finished steel products. The gain in operations is smaller than had been expected, due primarily to reduced buying of steel by the automotive industry.

• **Detroit** — Steel mills expect to maintain operations this week at about the same rate as last week. Based on official figures, the district is producing at the highest level of any in the country (99 on the basis of 100 for the 1957-59 average).

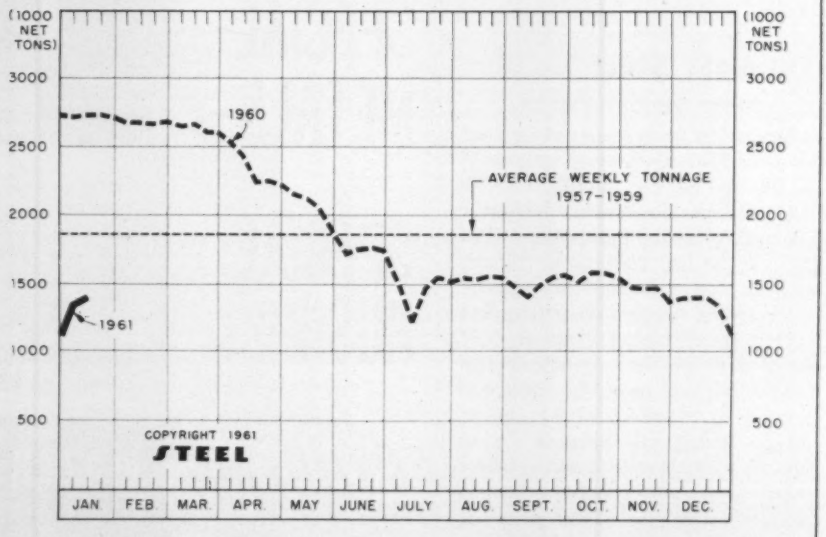
STEEL INGOT PRODUCTION

Weeks Ended	Net Tons	Change
Jan. 14	1,400,000*	+ 2.1%
Jan. 7	1,361,000	+23.4%
Dec. 31	1,103,000	−16.8%
Totals to Date		
1961	1,361,000	−49.9%
1960	2,715,000	

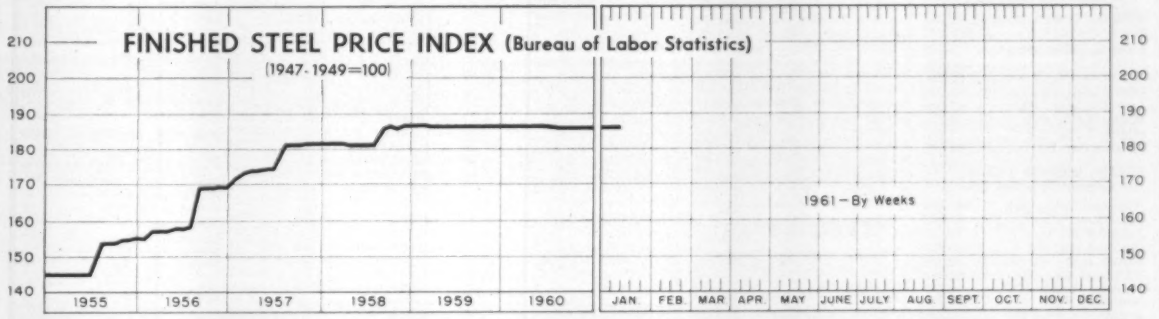
INDEX BY DISTRICTS

1957-1959=100	—Weeks Ended— Jan. 7	Dec. 31
Northeastern	70	52
Buffalo	59	54
Pittsburgh	62	49
Youngstown	58	38
Cleveland	77	52
Detroit	99	68
Chicago	85	75
Cincinnati	76	72
St. Louis	63	57
Southern	77	65
Western	85	81
Total Industry	73.1	59.2

*Estimated by STEEL.



Price Indexes and Composites



Jan. 10, 1961	Week Ago	Month Ago	Dec. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.335
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe, Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.414
Woven Wire Fence (20-rod roll)	21.003

STEEL's FINISHED STEEL PRICE INDEX

	Jan. 11 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	209.10
Index in cents per lb	6.713	6.713	6.713	6.713	5.665

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.00
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	31.83	31.00	28.67	41.67	53.33

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Jan. 11 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.97	5.97	5.97	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 1/2-5/8" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton

	Jan. 11 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	62.16
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tonf	245.00	245.00	245.00	245.00	205.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$29.50	$29.50	$26.50	$42.50	$54.50
No. 1 Heavy Melt, E. Pa.	35.00	35.00	34.00	42.00	55.00
No. 1 Heavy Melt, Chicago	31.00	28.50	25.50	40.50	50.50
No. 1 Heavy Melt, Valley	32.50	30.50	26.50	44.50	58.50
No. 1 Heavy Melt, Cleve.	28.50	26.50	23.50	41.50	54.50
No. 1 Heavy Melt, Buffalo	25.50	23.50	23.50	37.50	47.50
Rails, Rerolling, Chicago	54.50	53.50	46.50	62.50	72.50
No. 1 Cast, Chicago	39.50	38.50	36.50	54.50	51.50

COKE, Net Ton

Beehive, Furn., Connisvl	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, Jan. 11, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 115; footnotes, page 119.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2 U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ...99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 ....140.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 .119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2,W14 .122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 .5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. P4 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1 .5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. P4 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 ....7.625
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. P4 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshohocken,Pa. A3 ..6.375
Harrisburg,Pa. P4 ....6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.06
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ...6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15 ..6.425
S.Ch'c'go(9)R2,U5,W14 .5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 .6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11 ..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2 T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Seattle(6) B3 ....7.825
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 ....7.925
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Wrought Iron
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 ....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ..11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ..9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20

Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 .....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1..5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.175
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14..5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.)L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 .5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1..5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (16 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14..7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Longe Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Cleveland A7	15.55
Carnegie,Pa. S18	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.00C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless,Pa. U5	6.20	6.35	6.50	6.65
Gary,Ind. U5	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55

TIN PLATE,Hot Dipped 1.25 Common Coke	lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

Fully Processed	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70 ....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13 60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7, J4, T6	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass.A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

STEELMAKING AT JESSOP

175,000 pounds x 150 mph = shock treatment

The powerful jet engines whine in reduced-throttle restraint as the big, sleek aircraft maneuvers gracefully in its approach pattern.

In the cockpit, the crew goes through a check list. At one point the wheels are lowered and three green lights appear, indicating the gear is in position.

Then, a moment later, the pilot eases the 175,000 pound aircraft traveling 150 miles per hour onto the concrete—safely, surely, with confidence.

Probably, the steel in the landing gear was forged by Steel Improvement & Forge Company of Cleveland. For those components that bear the brunt of the impact, Steel Improvement purchases a Macro-Clean alloy made exclusively by Jessop at its Green River plant.

Only Jessop has it, this tough, sound-centered Macro-Clean alloy that takes in stride the transverse shock imposed on aircraft landing gear.

And the excellent physical properties inherent in Macro-Clean alloys make them ideally suited for numerous other applications too—crankshafts, gears of all kinds, pellet mills, driveshafts, large bearings and oil field goods for example.

Call any of Jessop's 23 sales offices in North America for Macro-Clean aircraft and forging quality alloys and a full range of specialty steels.

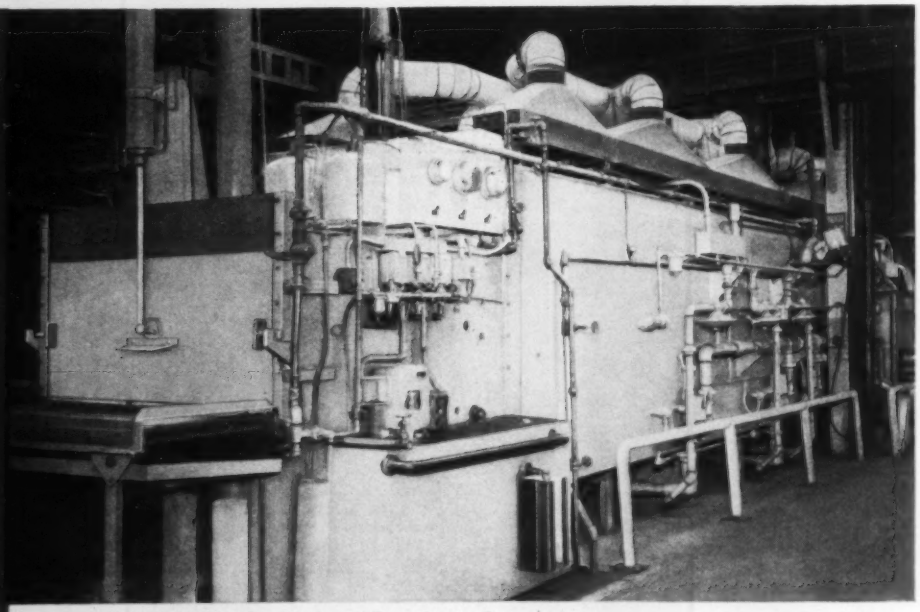
Jessop Steel Company
Washington, Pennsylvania

Plants and Service Centers:
Washington, Pa. • Los Angeles • Chicago • Detroit • Owensboro, Ky. • Wallaceburg, Ont.

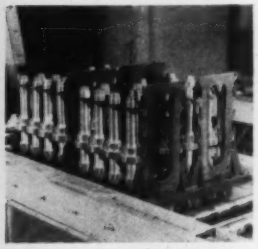
JESSOP

production carburizing

these exclusive Ipsen features guarantee the finest results for continuous production carburizing.



Ipsen 2P-12-2424-GM Double Row 4-Zone Pusher Furnace for Continuous Production Carburizing.



This charge of steel gears, and these countershafts, are typical of work which is being production-carburized in Ipsen furnaces.

AUTOMATIC Ipsen HEAT TREATING UNITS

IPSEN INDUSTRIES, INC. • DEPT. 739 • P.O. BOX 500 • ROCKFORD, ILLINOIS

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHt.,Ill. C2, I-2.	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	199**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPt.,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
All'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80†‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80†‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'im'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WOVEN FENCE, 9-15 Ga. Col.

Ala.City, Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonvill,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta (48) A11	9.00	9.75*
Bartonville(48)K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80†‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in., larger 12.85. 7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use aplicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws: ⅜ in. and smaller, 6 in. and shorter:

Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread: Through 1 in. diam., 6 in. and shorter:

Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.00	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2½	12	58.73	68.83	52.13
2¾	12	62.62	73.40	55.59
3	12			

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh 844	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 12.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	H.R. Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	29.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.35	43.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y., R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malleable	Bessemer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	66.00	66.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3 J1	78.00
Port Colborne, Ont. A25	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	8.66	10.06	....	8.28	8.55	11.70	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.65	9.80	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	9.22	10.20	10.70	52.00	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	8.57	9.88	11.24	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	9.48	10.46	11.05	52.00	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.66	10.64	11.14	....	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	8.95	11.20	11.45	61.27	10.65	9.00	14.20	17.35	9.90	8.40	11.15
Memphis, Tenn.	8.98	10.05	....	....	10.84	8.82	12.74	....	9.01	8.66	11.41
Milwaukee	9.36	10.34	10.84	....	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	8.92	10.55	10.50	....	10.90	8.90	11.00	16.30	9.26	8.76	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.88	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.48
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	9.42	10.58	11.08	....	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.80	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅜ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ½ in. and up	12.85
Fines, under ½ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5% f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.75-20.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charlestown, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted.)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30
Structural Shapes:	
Standard carbon	5.50
Angles & zees	5.40
Plates, Carbon:	
Sheared	5.45
Universal mill	5.10
Sheets & Coils, Hot Rolled:	
Carbon sheet	4.95
Carbon strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon sheet	6.35
Carbon strip:	
(0.080 and lighter)	6.35
(0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard quality	6.70
Culvert quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field grade	9.00
Armature grade	9.50
Electrical grade	10.15
Sheet Piling	6.15
Skelp	4.70
Rails, Heavy	5.55
Rails, Light	5.70
Joint Bars	6.55
Tie Plates	6.35
Grinding Balls (3 in. diam.)	7.00
Tin Mill Products	(Per base box; 100 lb base wt)
Coke tin plate (1.25 lb pot yield)	$10.60
Electrolytic tin plate (0.25 lb coating)	9.10
Black plate	8.30
Nails, Wholesale:	
Carload lots	Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, $8.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.50
Bronze powder, 90/10.	55.10
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types	0.78-1.06
Nickel-Silver	58.70
Solder	7.50*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	24.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten	nom.
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens	
Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50
Oven Foundry	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.25 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.62	....	$5.52	$5.37	$5.72
Bar Size Angles	5.75	....	5.65	5.50	5.85
Structural Angles	5.65	....	5.55	5.40	5.75
I-Beams	5.65	....	5.55	5.40	5.75
Channels	5.65	....	5.55	5.40	5.75
Plates (basic bessemer)	5.70	....	5.60	5.45	5.80
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.20	....	24.40	24.40	25.20
Barbed Wire (†)	6.50	....	6.40	6.25	6.60
Merchant Bars	5.75	....	5.65	5.50	5.85
Hot-Rolled Bands	5.85	....	5.75	5.60	5.95
Wire Rods, Thomas Commercial No. 5	5.80	....	5.75	5.75	6.00
Wire Rods, O. H., No. 5	6.00	....	5.95	5.95	6.25
Bright Common Wire Nails (‡)	6.85	....	6.75	6.60	6.95

*Book closed for 1960-61 shipping season. †Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Quality Steel

BETTER STEEL in ever-increasing quantities and varieties is needed by the world's growing industries.

YAWATA, biggest steelmaker in the Far East, has achieved its pre-eminence by concentrating on quality, dependability and low-cost production.

For your specific needs in STEEL, small or big, contact YAWATA for assured satisfaction.

YAWATA IRON & STEEL CO., LTD.

Head Office: No. 1, 1-chome, Marunouchi, Chiyoda-ku, Tokyo, Japan
Cable Address: **YAWATASTEEL TOKYO**
American Office: 375 Park Avenue, New York 22, N.Y., U.S.A.
Cable Address: **YAWATAISCO NEWYORK**
European Office: Immerman Strasse 15, Duesseldorf, West Germany
Cable Address: **YAWATAST DSSD**

Improved Quality Is Key To Increase in Scrap Use

Amount purchased by users depends on offerings of consistently high quality, accompanied with supporting proof, says speaker at convention of Institute of Scrap Iron & Steel

HOT METAL is scrap's competitor. The scrap industry is feeling the brunt of tremendous research by the steel industry, resulting in technological advances making it possible for the mills to use less scrap. That was pointed out by M. K. Mahler, president, Institute of Scrap Iron & Steel, at the 33rd annual convention of the organization in Miami Beach, Fla., last week.

Scrapmen realize the prime reason the mills have been developing substitutes for scrap is the lack of factual evidence about the real worth of scrap, he said. To correct the situation, an established research program aims primarily to measure and improve the quality of the material, chiefly No. 2 bundles, offered the mills.

W. L. Swager, Battelle Memorial Institute, Columbus, Ohio, is confident that an upturn in scrap will come when steelmen are shown it's economically advantageous for them to use more scrap. He stressed that the amount of No. 2 bundles sold the steel industry depends on offering consistently high quality material, accompanied with supporting proof of claims for the offerings.

Samuel Lipkowitz, economic adviser to the International Bank of Washington, predicted the upward climb in scrap prices might be more restrained than in the decade after World War II, that it might follow the 1958-59 pattern over the long run.

Scrap prices were too low in late 1960, he said, holding that if 1961 steel activity should approximate that of 1960, prices might average slightly higher than in 1960—probably around $35 a ton. He opined $40 scrap would be an incentive for integrated steelmakers to maximize use of hot metal.

Scrapmen Oppose Freight Rate Changes Before ICC

The interests of the iron and steel scrap industry will be defended by the Institute of Scrap Iron & Steel Inc. in a series of hearings before the Interstate Commerce Commission in connection with the most recent general increase in freight rates. While the across-the-board railroad rate boost was generally successful for the railroads in October, some portions remain for final argument before the ICC.

The institute's Transportation Committee claims the issue of free time at ports is vital to all dealers exporting scrap and that the institute, which has won four times previously in the last two years on the same issue, will again attack the railroads' position.

The carriers propose to reduce free time at the ports from seven to five days. The institute's Transportation Committee says reduction in the free time would result in extreme hardship to scrap dealers, resulting in heavy demurrage to be passed back to the shipping dealer from the exporter.

The institute is also opposing the present increase in force on switching rates, the proposed minimum car charge, and other weighing and service charges applying to scrap.

Scrap Price Composite Continues Steady Rise

Scrap Prices, Page 126

• **Chicago**—Mill purchases have pushed prices up another $2 to $3 a ton on several important grades. No. 1 industrial heavy melting was bought at $33 (up $3), although $30 continues to be the price of one mill for return tonnages of this grade from its customers. Other mill acquisitions included No. 1 dealer heavy melting at $30, No. 2 heavy melting at $28, and No. 1 dealer bundles at $31 (all up $2). Turnings were purchased at $2 higher, and cast grades are quoted $1 a ton higher. Railroad specialties also are $1 higher.

• **Pittsburgh** — Brokers' bids on B&O Railroad scrap were up $2 to $3 a ton from last month's figures, but it's unlikely that much of the material will be consumed here. Local foundries are operating at less than half of capacity, so there's no demand for rails. Prices of dealer grades are unchanged but may soon weaken unless the outlook for steelmaking improves. Some mills are predicting that they'll do no better in February than they've done this month.

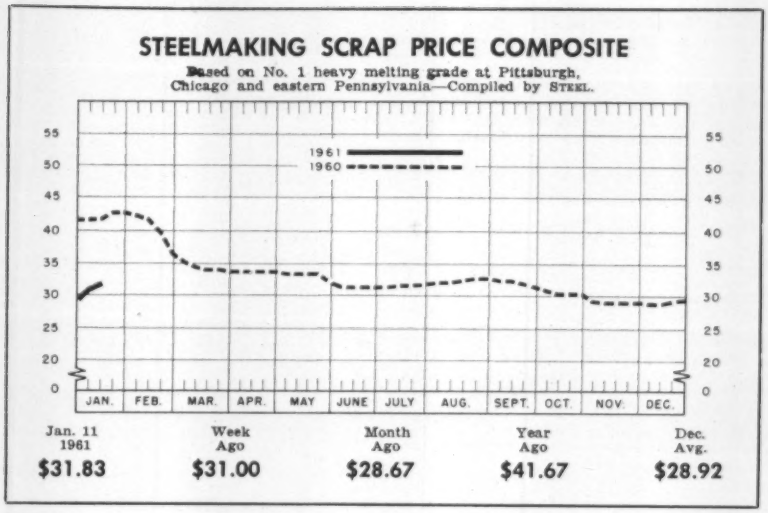
• **Philadelphia** — Domestic scrap buyers are showing more interest in the market than they have in some time. They are finding tonnages increasingly hard to get. Active export demand and bad weather are making collections difficult.

Domestic prices on No. 1 busheling have advanced $1 to $37, delivered, and on couplers, springs, and wheels to $39-$40. Low phos structurals and plates are higher at $38-$40, a gain of more than $1.

The Maritime Administration is

HOT DIP GALVANIZING
JOSEPH P. CATTIE & BROTHERS, INC.
2520 East Hagert Street
Phone: Re-9-8911 Philadelphia 25, Pa.

LOOKING FOR SURPLUS MACHINERY?
By checking the classified pages of STEEL each week you'll be able to find many different types of equipment which will fit your requirements. Used or surplus equipment—you can best find it in STEEL's classified columns.



offering 75 Liberty ships for scrapping. Bids for ten will be opened on Jan. 24, the remainder Jan. 31. The ships are part of the 2000 vessels in the government's reserve fleet maintained in Alabama, California, North Carolina, Oregon, Texas, and Washington.

• **New York**—Brokers' buying prices on the major open hearth grades are strong, with No. 2 bundles $1 a ton higher at $15-$16. Strength is supported primarily by strong export demand. Prices on cast grades are steady on domestic demand. Borings and turnings are moving slowly, with prices nominal.

Published prices for 18-8 sheets, clips, and solids and Type 430 material are confirmed on light trading.

• **Detroit**—Scrap prices are holding steady. Activity has dropped back slightly following the preceding week's flurry of orders placed chiefly by export buyers outside the district. Now that yearend property and inventory tax loads have passed, sellers think there may be a little more buying by local firms when February auto lists come out. Increased foundry activity is keeping prices firm on cast grades. One small order of heavy breakable sold last week for $23.

• **Buffalo** — Primary scrap grades are up $2 a ton here. Steel mills here are still out of the market. so the market strength is due entirely to export buying and firmness in other scrap centers.

The secondary mill grades have failed to rise since they are not sharing in the export activity. The same is true of blast furnace scrap, which continues at relatively low price levels.

Dealers agree that when local mills come back into the market, they will have to pay more for scrap.

• **Cincinnati**—Prices on principal steelmaking grades rose $1 a ton last week with No. 1 heavy melting at $24.50-$25.50 a ton. Despite the buying program by an area mill at higher prices and the limited entry into the market by another area mill, the trade is having difficulty filling orders because of dealer price resistance. Dealers, seeing the start of a price upturn, are reluctant to sell at current levels.

• **St. Louis**—Business in the scrap market is slow, although the undertone remains firm. An increase in mill operations will be required before an upward price trend develops. Prices on railroad grades are especially strong.

• **Birmingham**—The scrap market strengthened here last week on substantial purchases by electric furnace operators. Prices have risen to $34-$35 on electric furnace bundles and electric furnace scrap 3 ft and under and to $36-$37 on electric furnace scrap 2 ft and under.

Higher prices are quoted on No. 1 cupola and stove plate at $45-$46, unstripped motor blocks at $33-$34, 18 in. and under rails at $45-$46, and random length rails at $37-$38.

• **Houston**—Export demand continues to be the dominating factor in the Gulf Coast market for steel scrap. Texas mills are doing little or no buying. One major mill is buying small quantities of low copper scrap, although it has placed no orders with brokers through January.

Export prices have edged upward in Beaumont, Tex. and in New Orleans and Baton Rouge, La., with quotations of $35 a gross ton for No. 1 heavy melting steel and $32 for No. 2. The intake of scrap in the Houston area has improved slightly in recent weeks.

• **San Francisco**—The next move in steel scrap prices will probably be upward. Mills are still buying only on a hand-to-mouth basis. Any increase in their orders will likely result in price advances of $1 or $2 a ton.

• **Seattle**—A revision of scrap prices is expected soon. Prospects for more active trading have improved, although the market is still quiet. More interest in the export section is strengthening the entire market.

Michaelson Steel & Supply Inc., Everett, Wash., is the successful bidder for salvaging the 18 mile, Schafer railroad in Grays Harbor and Mason Counties, Washington. It involves 3000 tons of steel rails and other materials.

• **Los Angeles**—The scrap market is steadily tightening, with export sales the main factor. Local dealers expect larger domestic mills to enter the market in February on a limited basis. The smaller mills continue to use 10,000 tons monthly. A shortage of No. 1 cupola exists, but demand from foundries has been slight, and dealers are not concerned.

Pig Iron . . .

Pig Iron Prices, Page 121

Movement of merchant iron is slow with sellers awaiting a seasonal pickup. But shipments for the month will be larger than they were in December when many foundries cut back operations for the holidays.

Producers have curtailed output

(*Please turn to Page* 131)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Jan. 11, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Jan. 11	$31.83
Jan. 4	31.00
Dec. Avg.	28.92
Jan. 1960	41.92
Jan. 1956	52.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 dealer bundles	29.00-30.00
No. 2 bundles	23.00-24.00
No. 1 busheling	29.00-30.00
No. 1 factory bundles	35.00-36.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	11.00-12.00
Short turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals:	
2 ft and under	32.00-33.00
3 ft and under	31.00-32.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	35.00-36.00
Electric furnace bundles	36.00-37.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	31.00-32.00
Stove plate	27.00-28.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	31.00-32.00
Drop broken machinery	44.00-45.00§

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-33.00*
Rails, 2 ft and under	*47.00-48.00*
Rails, 18 in. and under	*48.00-49.00*
Random rails	*43.00-44.00*
Angles, splice bars	37.00-38.00
Railroad specialties	39.00-40.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*30.00-33.00*
No. 1 hvy melt., dealer	*29.00-30.00*
No. 2 hvy melting	*27.00-28.00*
No. 1 factory bundles	33.75-34.75
No. 1 dealer bundles	*30.00-31.00*
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	*30.00-33.00*
No. 1 busheling, dealer	*29.00-30.00*
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*16.00-17.00*
Shovel turnings	*16.00-17.00*
Cast iron borings	*16.00-17.00*
Cut structurals, 3 ft	33.00-34.00
Punchings & plate scrap	35.00-36.00

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Stove plate	*33.00-34.00*
Unstripped motor blocks	*31.00-32.00*
Clean auto cast	*44.00-45.00*
Drop broken machinery	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*33.00-34.00*
R.R. malleable	*43.00-44.00*
Rails, 2 ft and under	*45.00-46.00*
Rails, 18 in. and under	*46.00-47.00*
Angles, splice bars	*40.00-41.00*
Axles	53.00-54.00
Rails, rerolling	*54.00-55.00*

Stainless Steel Scrap

18-8 bundles, solids	*170.00-175.00*
18-8 turnings	90.00-95.00
430 bundles & solids	*85.00-90.00*
430 turnings	*45.00-50.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	20.00-21.00
No. 2 heavy melting	15.00-16.00
No. 1 bundles	*22.00-23.00*
No. 2 bundles	12.00-13.00
No. 1 busheling	19.00-20.00
Machine shop turnings	6.00-7.00
Mixed borings, turnings	6.00-7.00
Shovel turnings	7.00-8.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Stove plate	23.00-24.00
Heavy breakable	22.00-23.00
Unstripped motor blocks	18.00-19.00
Charging box cast	24.00-25.00
Clean auto cast	35.00-36.00

CLEVELAND

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	19.00-20.00†
No. 1 factory bundles	*34.00-35.00*
No. 1 bundles	27.00-28.00
No. 2 bundles	16.00-17.00
No. 1 busheling	*29.00-30.00*
Machine shop turnings	10.00-11.00
Shovel turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut foundry steel	*31.00-32.00*
Cut structurals, plate 2 ft and under	36.00-37.00
Low phos. punchings & plate	28.00-29.00
Alloy free, short shovel turnings	14.00-15.00
Electric furnace bundles	28.00-29.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	24.00-25.00
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	43.00-44.00
Burnt cast	30.00-31.00
Drop broken machinery	44.00-45.00

Railroad Scrap

R.R. malleable	42.00-43.00
Rails, 2 ft and under	45.00-46.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	38.00-39.00
Cast steel	*38.00-39.00*
No. 1 railroad cast	42.00-43.00
Railroad specialties	*42.50-43.50*
Angles, splice bars	*40.50-41.50*
Rails, rerolling	*53.00-54.00*

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	150.00-155.00
18-8 turnings	65.00-70.00
430 clips, bundles, solids	65.00-70.00
430 turnings	10.00-20.00

YOUNGSTOWN

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	21.00-22.00
No. 1 busheling	32.00-33.00
No. 1 bundles	32.00-33.00
No. 2 bundles	20.00-21.00
Machine shop turnings	12.00-13.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	33.00-34.00
Electric furnace bundles	33.00-34.00

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*

BUFFALO

No. 1 heavy melting	*25.00-26.00*
No. 2 heavy melting	19.00-20.00
No. 1 bundles	*25.00-26.00*
No. 2 bundles	16.00-17.00
No. 1 busheling	*25.00-26.00*
Shovel turnings	13.00-14.00
Machine shop turnings	9.00-10.00
Cast iron borings	11.00-12.00
Low phos. structurals and plates, 2 ft and under	*35.00-36.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	36.00-37.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	*38.00-39.00*
Rails, 3 ft and under	*44.00-45.00*
Railroad specialties	*37.00-38.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*24.50-25.50*
No. 2 heavy melting	*21.50-22.50*
No. 1 bundles	*24.50-25.50*
No. 2 bundles	*17.00-18.00*
No. 1 busheling	*24.50-25.50*
Machine shop turnings	*10.00-11.00*
Mixed borings, turnings	*10.00-11.00*
Shovel turnings	*11.00-12.00*
Cast iron borings	*11.00-12.00*
Low phos. 18 in.	*33.00-34.00*

Cast Iron Grades

No. 1 cupola	*35.00-36.00*
Heavy breakable cast	28.00-29.00
Charging box cast	*35.00-36.00*
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	29.00-30.00
Rails, 18 in. and under	44.00-45.00
Rails, random lengths	36.00-37.00

PHILADELPHIA

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00
No. 1 bundles	*38.00*
No. 2 bundles	21.00
No. 1 busheling	*37.00*
Electric furnace bundles	*38.00*
Mixed borings, turnings	14.00†
Shovel turnings	18.00†
Machine shop turnings	13.00†
Heavy turnings	25.00†
Structurals & plates	*38.00-40.00*
Couplers, springs, wheels	*39.00-40.00*
Rail crops, 2 ft & under	46.00-48.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	39.00
Drop broken machinery	47.00-48.00
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	27.00-28.00
No. 2 bundles	*15.00-16.00*
Machine shop turnings	3.50-4.00†
Mixed borings, turnings	4.00-4.50†
Shovel turnings	5.00-6.00†
Low phos. structurals & plates	31.00-32.00†

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	23.00-24.00
Heavy breakable	28.00-29.00

Stainless Steel

18-8 sheets, clips, solids	140.00-145.00
18-8 borings, turnings	70.00-75.00†
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	23.00-24.00
No. 1 busheling	23.00-24.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	22.00-23.00
No. 1 bundles	*33.00-34.00*
No. 2 bundles	20.00-21.00
No. 1 busheling	*33.00-34.00*
Cast iron borings	10.00-11.00
Machine shop turnings	15.00-16.00
Shovel turnings	18.00-19.00
Bar crops and plate	35.00-36.00†
Structurals & plate	35.00-36.00†
Electric furnace bundles	*34.00-35.00*
Electric furnace:	
3 ft and under	*34.00-35.00*
2 ft and under	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Stove plate	*45.00-46.00*
Unstripped motor blocks	*33.00-34.00*
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18 in. and under	*45.00-46.00*
Rails, random lengths	*37.00-38.00*
Angles, splice bars	36.00-37.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	27.00
No. 2 heavy melting	25.00
No. 1 bundles	28.00
No. 2 bundles	*19.00*
No. 1 busheling	28.00
Machine shop turnings	8.00
Shovel turnings	10.00

Cast Iron Grades

No. 1 cupola	36.00
Charging box cast	33.00
Heavy breakable cast	31.00
Unstripped motor blocks	33.00
Clean auto cast	39.00
Stove plate	*35.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*31.00*
Rails, random lengths	*37.00*
Rails, rerolling	*49.00*
Rails, 18 in. and under	41.00
Angles, splice bars	37.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	29.00
No. 1 bundles	31.00-32.00
No. 2 bundles	18.00-19.00
Machine shop turnings	7.00-8.00†
Low phos. plate & structurals:	
3 ft	34.00
2 ft and under	36.00-37.00

Cast Iron Grades

No. 1 cupola	33.00-33.50
Heavy breakable	24.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	27.00-27.50

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00

LOS ANGELES

No. 1 heavy melting	*30.00**
No. 2 heavy melting	*26.00**
No. 1 bundles	*25.00*
No. 2 bundles	*17.00**
Machine shop turnings	*12.00*
Shovel turnings	*12.00*
Cast iron borings	*12.00*
Cut structurals and plate 1 ft and under	*41.00*

Cast Iron Grades

No. 1 cupola	*40.00-41.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-36.00*

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 2 bundles	19.00
Shovel turnings	13.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	31.50
Heavy breakable	31.00
Unstripped motor blocks	31.00
Stove plate (f.o.b. plant)	18.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	36.00
No. 1 (prepared for shears)	33.00
No. 1 hvy (unprepared)	33.00
No. 2 heavy melting	34.00
No. 2 hvy (unprepared)	30.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	31.50
Heavy breakable cast	33.00
Unstripped motor blocks	30.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

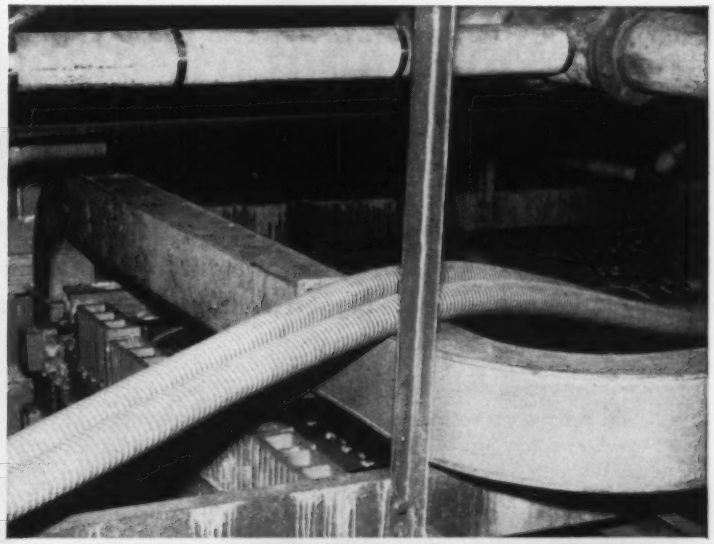
(Brokers' buying prices; net tons)

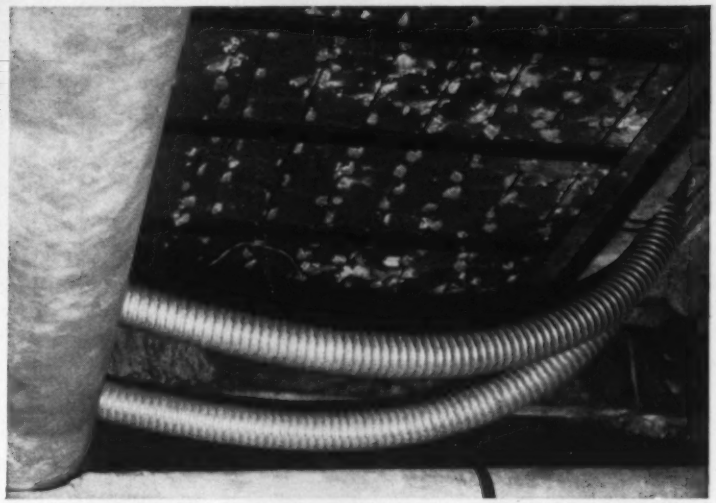
No. 1 heavy melting	24.00
No. 2 hvy melt, 2 ft & under	22.50
No. 1 bundles	24.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	23.00
Unprepared	18.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	30.00

*For export add $4 dock charges.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.





For air conditioning: Three conductor, 500 Mcm, 37 wire, 5/64" varnished-cambric insulated Anaconda Duralox Cable was quickly, easily installed in older building to handle new load. Cable runs from breaker box in west wing (left) through loft of roof (top right) to side wall building and down wall (bottom right) to breaker box on lower floors.

PROBLEM: Installing new circuits in old building
SOLUTION: Duralox Interlocked-armor Cable

or: *How to do a hard job the easy (and low-cost) way*

Installing new circuits in an old building—whether for air conditioning, as the case here, or for new machinery or new load centers—can be tough and costly. You either have to go around existing obstructions, a laborious job with rigid conduit, or remove them.

The ideal solution is Anaconda Duralox Interlocked-armor Cable.

Because it is flexible, Duralox Cable is quick, economical to install—indoors or out—with simple supporting devices. It trains easily around corners, columns and other obstructions in *long, unbroken runs.* Circuits are easy to relocate . . . always accessible. Duralox's interlocked metal-tape armor affords excellent protection against mechanical damage.

Anaconda Interlocked-armor Cable is available in sizes No. 6 Awg to 750 Mcm—copper or aluminum conductors—up to 15 Kv. Underwriters' approved for 600 volts and 5000 volts. With rubber, plastic, or varnished-cambric insulation.

BULLETIN DM 5606 on Anaconda Duralox Cable gives you full information. Write for your copy today. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

61263

ASK THE MAN FROM **ANACONDA®**

FOR **INTERLOCKED-ARMOR CABLE**

'61 Stacks Up as Year of Labor Peace

Few strike possibilities are in the offing since most contracts don't expire until 1962. Biggest contract to be negotiated is at Kennecott Copper Corp.

Nonferrous Metal Prices, Pages 130 & 131

THIS WILL BE a year of peace and quiet on the nonferrous labor scene. Some strikes may be called, but not enough contracts expire to seriously threaten disruption in the supply of any major metal. Most companies will be looking ahead to '62 when many contract have to be negotiated in the major metals.

• **Quiet in Aluminum**—With one exception, contracts of primary aluminum producers run until August, 1962. Anaconda Aluminum Co. must negotiate a new agreement at its Columbia Falls, Mont., reduction plant and its Terre Haute, Ind., mill in the autumn. Under terms of the contract signed in 1959, the four major producers (Alcoa, Reynolds, Kaiser, and Ormet) have labor increases of 7.1 cents an hour in direct wages and up to 3 cents in cost of living coming due in August. They could lead to a price hike in the light metal if sales have improved substantially by then.

• **Nickel, Magnesium**—The nickel situation looks good. Ditto for magnesium. Contracts at International Nickel Co. of Canada Ltd.'s Canadian mines and refineries don't expire until Jan. 1, 1962. The contract at the Dow Chemical Co. primary magnesium facility runs until the summer of 1963. Some brass mill contracts come up for negotiation this year. The unions may be less demanding than usual because of the depressed state of that industry, believe some observers.

• **Copper Is Question**—The biggest potential hot spot of 1961 is in copper.

Contracts expire at virtually all of Kennecott's U. S. facilities in June and July. The question: Will there be a peaceful settlement or a repetition of the walkout that closed down the country's largest producer for months in 1959 and early 1960? "It would take some real genius to fumble into a strike this year," acidly comments one observer. The key will be union rivalry, a major factor in most copper disputes since the early 1950s.

The United Steelworkers of America is making a determined bid to pick up strength at the expense of the International Union of Mine, Mill & Smelter Workers. Mine-Mill's position is weak. Membership is down to around 50,000, and battle funds are low (it has had to borrow from another union).

Yet, the union has to win a contract as good or better than the USW's to maintain its strength. Chances are that neither the USW nor Mine-Mill will press Kennecott too hard this year, believe metalmen.

So far, there has been no official hint about demands. But it seems fairly safe to assume that the unions will ask for a 7 to 9 cent an hour wage increase in the first year —the amount some of the workers at other copper companies will get in 1961 under contracts expiring in 1962. And there will probably be some demands involving pensions and other fringes.

A few contracts at other copper companies also expire, but the big play will be at Kennecott. Other major producers, notably Anaconda Co. and Phelps Dodge Corp., have agreements that run until 1962.

It would take a major shutdown to have much impact on the U. S. consumer. The world industry is overproducing now, and the situation will get worse as the year wears on unless demand takes a sharp upturn.

• **Quiet Year for Lead, Zinc**—A few contracts expire in the lead and zinc industries, but it doesn't seem likely there could be enough trouble to noticeably hurt supply. Two major producers, New Jersey Zinc Co. (zinc only) and Bunker Hill Co., recently negotiated new agreements. As in copper, most of the other lead and zinc contracts expire in '62.

NONFERROUS PRICE RECORD

	Jan. 11 Price	Last Change	Previous Price	Dec. Avg	Nov. Avg	Jan., 1960 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	26.000
Copper	29.00–30.00	Jan. 11, 1961	30.00	30.000	30.000	34.000
Lead	10.80	Dec. 13, 1960	11.80	11.185	11.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	100.25	Jan. 11, 1961	100.375	101.631	103.359	99.875
Zinc	11.50 (nom.)	Jan. 9, 1961	12.00	12.481	13.000	12.917

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, East St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingot, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Zinc Down in '60

Slab zinc shipments in 1960 dropped to 831,238 tons, the second lowest year since 1950. Production, at the same time, rose slightly to 867,629 tons. Producer's stocks, which started off the year at 144,471 tons, ended up at 190,810 tons. Production of special high grade zinc totaled 353,585 tons.

Our high speed steels are for performance

– exactly suited to your needs!

FIRST QUALITY · TOOL & SPECIAL STEELS · V-A

Whatever the major problem of the tool application—be it abrasion, impact, high temperature or other prevailing condition—Vanadium-Alloys has a *first quality* High Speed Steel grade to take it in stride. For the performance you need on the jobs you have, it's V-A all the way. Use the experience of our sales engineer in your district—his recommendations can make money for you!

Write for Data Sheets

VASCO SUPREME: Highest hardness, highest wear resistance, supreme in the field. (U. S. Pat. 2174286.)

NEATRO: Resistance to abrasion exceeds all steels except Vasco Supreme. Excels for both heavy and light cutting.

VAN CUT: High carbon, high vanadium. Properties intermediate between Vasco M-2 and Neatro for easier grinding. Suitable for all types of cutting tools.

RED CUT SUPERIOR: The nation's best known general-purpose steel. Readily fabricated and heat treated. Shines in a host of applications.

VASCO M-2: The original 6-6-2 type steel. Wide hardening range, good machining characteristics, outstanding economy in service.

8-N-2: Low tungsten, high molybdenum, very tough at high hardness. Excels for fine edged tools.

VAN-LOM: High molybdenum, high vanadium. Best cutting performance of all high molybdenum steels.

Vanadium-Alloys Steel Company

GENERAL OFFICES: LATROBE, PA.

DIVISIONS: Anchor Drawn Steel Co. • Colonial Steel Co. • Metal Forming Corporation • Pittsburgh Tool Steel Wire Co.

SUBSIDIARIES: Vanadium-Alloys Steel Canada Limited • Vanadium-Alloys Steel Societa Italiana Per Azioni • EUROPEAN ASSOCIATES: Societe Commentryenne Des Aciers Fins Vanadium-Alloys (France) • Nazionale Cogne Societa Italiana (Italy)

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 30.00 deld.; custom smelters, 29.00; lake, 30.00 deld.; fire refined, 29.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex, 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ32A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, N. York, $208-210 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports or entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 100.25; prompt, 100.125.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: owder, 98.8%, carbon reduced, 100-lb lots, $2.75-2.85 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.85; special high grade, 13.00 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 14.75; No. 5, 14.50 deld. (All prices are nominal.)

Zirconium: Reactor grade sponge, 100 lb or less, $8.8.50 per lb; 100-500 lb, $7.25-7.50 per lb, 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 28.25; tin bronze, No. 225, 38.00; No. 245, 32.50; high-leaded tin bronze, No. 305, 32.75; No. 1 yellow, No. 405, 23.50; manganese bronze, No. 421, 27.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.945, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.945, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 35.35; l.c.l., 35.98. Weatherproof, 20,000-lb lots, 36.30; l.c.l., 37.05.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 21.50-22.00; No. 2 heavy copper and wire, 19.50-20.00; light copper, 16.75-17.25; No. 1 composition red brass, 17.75-18.25; No. 1

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	55.13b	52.36c	....	56.32
Yellow Brass	49.27	34.88d	49.56	53.43
Low Brass, 80%	51.75	51.69	52.04	55.81
Red Brass, 85%	52.62	52.56	52.91	56.68
Com. Bronze, 90%	54.03	53.97	54.32	57.84
Manganese Bronze	57.77–57.82	51.42–51.46	61.69	....
Muntz Metal	52.14	47.45	....	....
Naval Brass	54.08	47.89	60.39	58.24
Silicon Bronze	60.45–60.48	59.64–59.67	59.74–59.77	78.89
Nickel Silver, 10%	64.68	67.01	66.76	....
Phos. Bronze, A-5%	75.70	76.20	75.45	77.63

SCRAP ALLOWANCES e

(Based on copper at 30.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	26.000	26.000	25.250
Yellow Brass	20.375	19.625	18.625
Low Brass, 80%	22.500	22.250	21.750
Red Brass, 85%	23.250	23.000	22.500
Com. Bronze, 90%	24.000	23.750	23.250
Manganese Bronze	19.250	19.000	18.375
Muntz Metal	19.475	19.125	18.625
Naval Brass	19.125	18.875	18.375
Silicon Bronze	25.500	25.250	24.500
Nickel Silver, 10%	25.125	24.875	12.562
Phos. Bronze, A-5%	27.125	26.875	25.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 16.75-17.25; new brass clippings, 14.75-15.25; light brass, 11.75-12.25; heavy yellow brass, 12.75-13.25; new brass rod ends, 13.75-14.25; auto radiators, unsweated, 13.00-13.50; cocks and faucets, 14.50-15.00; brass pipe, 14.75-15.25.

Lead: Soft scrap lead, 7.25-7.75; battery plates, 2.25; linotype and stereotype, 8.00-8.50; electrotype, 7.00-7.25; mixed babbitt, 9.00-9.50.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 2.50-3.00; new diecast scrap, 3.75-4.00; old diecast scrap, 2.25-2.75.

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.00-11.50; segregated high copper clips, 10.00-10.50; mixed low copper clips, 10.50-11.00; mixed high copper clips, 10.00-10.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00; clean borings and turnings, 8.50; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.

Copper and Brass: No. 1 heavy copper and wire, 24.00; No. 2 heavy copper and wire, 22.50; light copper, 20.25; refinery brass (60% copper) dry copper content, 20.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.00; No. 2 heavy copper and wire, 22.50; light copper, 20.25; No. 1 composition borings, 19.00; No. 1 composition solids, 19.75; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 16.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.04; oval, 43.50, 5000-10,000 lb; electrodeposited, 39.00, 2000-5000 lb lots; cast, 41.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 18.75; flat tops, 18.75; flats, 21.50; ovals, 20.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.25; 2000-5900 lb, 13.25; 6000-11,900 lb, 13.00; 12,000-22,900 lb, 12.75; 23,000 lb or more, 12.25.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (Anhydrous): 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

Stannous Sulphate: Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 125*)

and are expected to make additional cuts. The Swedeland, Pa., producer blew out a blast furnace recently for repairs, leaving one in operation.

Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., is scheduled to shut down its only active blast furnace in mid-January. This will leave the Buffalo district with only five active blast furnaces out of 16.

Wickwire Spencer has built up sufficient iron inventories for its own needs and to meet merchant iron demand. The mill is expected to increase its use of scrap in open hearth melts during the blast furnace department shutdown.

Nineteen furnaces in the Chicago district are active vs. 18 in late December.

Steel Bars . . .

Bar Prices, Page 114

Inquiries for bars are picking up, but there has been no appreciable pickup in orders. Builders of light industrial equipment and agricultural machinery are inquiring more actively. There is a slight improvement in inquiry from fastener manufacturers to round out inventories which are still fairly substantial.

Cold drawers are exerting no pressure for hot bars. Their stocks appear to be in good balance. Apart from some military requirements, demand for cold finished bars still lags.

Structural Shapes . . .

Structural Shape Prices, Page 114

Structural steel orders are light, due mainly to seasonal factors. The outlook has improved in view of the growing amount of work on drawing boards. Most fabricators are encouraged over prospects of a pickup within another month to six weeks. They have sufficient work to keep them going on a moderately good schedule.

While structurals remain the strongest item in the Los Angeles market, smaller fabricators are running into serious money problems. Some report business off as much as 30 per cent, and prices remain low. Larger integrated fabricators have been bidding on smaller jobs than formerly. Any material improvement will probably not develop until after Mar. 1 (local taxation date

CLASSIFIED

Partner Wanted

Partner wanted for fabricating shop, specializing in stainless and alloy materials for pressure vessels, tanks and equipment for food and chemical industries. Must be experienced in job shop and production operations, also have ability in sales or accounting. Investment required $25,000.00 to $50,000.00. Chicago area.

Reply Box 898, STEEL
Penton Bldg. Cleveland 13, Ohio

Help Wanted

ENGINEERS
DESIGNERS

McKee offers permanent career opportunities to individuals qualified by experience to undertake the design of:

Steel Plants — Refineries
Sintering Plants — Chemical Plants
Pelletizing plants — Petro-Chem Plants

Remuneration commensurate with experience and ability.

Reply in confidence to:
G. VICTOR HOPKINS
ARTHUR G. McKEE & COMPANY
2300 Chester Ave. • Cleveland 1, O.

DEFENSE COMPANY NEEDS
Top man to set up and run new Forging Dept., making all type plumbing fittings—Steel, Stainless, Brass etc. Must be able to lay out plant and recommend correct Presses, also Hammers to buy. Send resume of experience to Bill Martin.
C & E FORGING CORPORATION
1710 W. Florence Ave., Inglewood, Calif.

Help Wanted

METALLURGIST: Minimum five years' experience Atmosphere Control Furnace Operations in either wire, rods or bars in carbon and alloy grades. Must be thoroughly experienced to take complete charge of laboratory and furnace operations. Position is of the highest importance and offers permanent stability with a prominent cold finished bar mill located in the East. Please do not apply unless fully qualified in every respect and furnish complete resume which will be held strictly confidential. Write Box 894, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALESMAN TO COVER CHICAGO TERRITORY selling mill and heavy industrial overhead traveling cranes. Respond to Box 893, STEEL, Penton Bldg., Cleveland 13, Ohio.

WANTED: COLD ROLLED STRIP STEEL SALESMAN for Michigan territory. Replies confidential. Write Box No. 895, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

AVAILABLE—27 years Purchasing experience—20 of these in steel, handling total plant needs, raw materials, rolls, maintenance and fabrication. Some early experience in auditing and accounting. Now in Pittsburgh, willing to relocate. Reply Box 897, STEEL, Penton Bldg., Cleveland 13, Ohio.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind.

Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry. When you have an opportunity to offer, use the Help Wanted columns of STEEL.

PRECISION GROUND SHAFTING

■ Universal's new service saves inventory and handling costs for your precision shafting needs. Lengths to 40 feet, any ferrous or non-ferrous stock.

Request Illustrated Grinding Catalog

UNIVERSAL GRINDING CORPORATION
2200 Scranton Rd., Cleveland 13, Ohio

What makes the first gear-type coupling still first choice?

Check design . . . and you'll find Fast's Couplings (the original gear-type couplings) are superbly engineered, ruggedly built, smoothly running units designed to outlast the machines they connect.

Check completeness of line . . . and you'll find Fast's Couplings come in a complete range of sizes and types for shafts from ½" to 32" and larger.

Check service . . . and you'll find Fast's Couplings are backed by expert help from experienced field engineers . . . while outstanding stock facilities throughout the country insure speedy delivery of your coupling orders.

Check popularity . . . and you'll find Fast's Couplings are the choice of more industrial equipment manufacturers than any other shaft coupling.

Check Fast's for your coupling needs today.

KOPPERS COMPANY, INC., 301 Scott St., Baltimore 3, Md.

KOPPERS

FAST'S COUPLINGS
Engineered Products Sold with Service

and the opening of state highway construction).

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1927 tons, state highway bridge, Somerset-Swansea, Mass., to American Bridge Div., U. S. Steel Corp., Pittsburgh, through Marinucci Bros. & Co. Inc., Boston, general contractor.

1807 tons, Puget Sound Naval shipyard, Bremerton, Wash., to Caine Steel Co., Chicago.

940 tons, bridge and connecting ramps over Jones Falls Expressway, Baltimore, to American Bridge Div., U. S. Steel Corp., Pittsburgh; McLean Construction Co., Baltimore, general contractor.

600 tons, additional award for military installation at Roi Namur, Marshall Islands (South Pacific) to Leckenby Structural Steel Co., Seattle.

488 tons, Puget Sound Navy Yard, Bremerton, Wash., to Isaacson Iron Works, Seattle

215 tons, Puget Sound Navy Yard, Bremerton, Wash., to Gaynor Steel Co., Seattle.

213 tons, high school, South Burlington, Vt., to Vermont Structural Steel Corp., Burlington, Vt., through H. P. Cummings Construction Co., Woodsville, N. H.; also, 54 tons of reinforcing bars to Truscon Steel Div., Republic Steel Corp., Boston.

200 tons, addition to Rogue River Hospital, Medford, Oreg., to Poole, McGonigle & Dick, Portland, Oreg.; Graff & James, Medford, general contractors at $1,104,067.

161 tons, state overpass, Route 208, Section 2, Bergen county, New Jersey, through Glenwal Co., general contractor, Rochelle Park, N. J., to Golish Iron Works.

115 tons, bridge, state project No. 3435, Pittsfield, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine, through Norman E. Jackson Inc., Pittsfield, general contractor.

114 tons, transmission towers, to Universal Fabricating Co., Portland, Oreg., by Bonneville Power Administration, Portland.

100 tons, post office, General Services Administration, Houston, to Mosher Steel Co., Lubbock, Tex.; Leavell Investment Co., El Paso, Tex., general contractor.

REINFORCING BARS . . .

REINFORCING BARS PENDING

975 tons, also miscellaneous steel, Washington State freeway, Puyallup River bridge, Tacoma, Wash.; bids to Olympia, Wash., Jan. 24.

355 tons, pontoons for floating guide wall, Ice Harbor Dam project, Snake River, 550 ft long, 4600 ton displacement; bids to U. S. Engineer, Walla Walla, Wash., Feb. 28; $800,000 project.

250 tons, Idaho State, six highway structures, Bingham County; bids soon.

233 tons (also steel piling), five concrete highway spans, Shoshone County, Idaho; state project; bids to Boise, Jan. 24.

130 tons, Washington State box girder bridge, Grant County; Concrete Construction Co., Tacoma, Wash., is low at $122,076.

130 tons, Washington State girder bridge, Whatcom County; E. Seleme & Sons, Bellingham, Wash., low at $99,306.

100 tons or more, Montana State 1486 ft overpass, Park County; general contract to Schultz & Lindsay Construction Co., Fargo, N. Dak., low at $505,374.

PLATES . . .

PLATES PLACED

6444 tons, plates and shapes, Puget Sound Naval shipyard, Bremerton, Wash., to Columbia-Geneva Steel Div., U. S. Steel Corp., Seattle.

4068 tons, Puget Sound Naval shipyard, Bremerton, Wash., to Kaiser Steel Corp., Seattle.

165 tons, alloy, Navy General Stores Supply Office, Philadelphia, to Phoenix Steel Corp., Claymont, Del.; also required, 150 tons of steel sheets to Ziegler Steel Service Corp., Los Angeles.

PIPE . . .

CAST IRON PIPE PLACED

288 tons, 6 and 8 in., King County District No. 99, Seattle, to U. S. Pipe & Foundry Co., Seattle.

Advertising Index

Aetna Ball & Roller Bearing Co., Division of Parkersburg-Aetna Corporation 16
Allen-Bradley Co. 99, 100
American Chain & Cable Co., Inc., Page Steel & Wire Division 65
Anaconda Wire & Cable Co. 127
Atlas Car & Mfg. Co. 10

Basic Products Corporation, Hevi-Duty Electric Co. Division 21
Bethlehem Steel Co. 1, 25, 26, 27, 28
Bullard Co., The 50
Bunting Brass & Bronze Co., The 101

C & E Forging Corporation 131
Carpenter Steel Co., The 11
Cattie, Joseph P., & Brothers, Inc. 124
Chicago Steel Service Co. 62
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 94
Colorado Fuel & Iron Corporation, The 61

Detroit Steel Corporation 30
De Vlieg Machine Co. 22, 23
DoAll Co., The 79

Electric Controller & Mfg. Division, Square D Co. ..... Inside Front Cover
Erie Bolt & Nut Co. 110

General Electric Co., Metallurgical Products Department 14, 15

Heppenstall Co. 58
Hevi-Duty Electric Co., A Division of Basic Products Corporation 21
Hill Acme Co., The 24
Hunt Valve Co., Division of IBEC 91

Industrial Distributors (Sales), Ltd. 88, 89
Inland Steel Co. 34
International Business Machines 8, 9
Ipsen Industries, Inc. 118

Jessop Steel Co. 117
Joy Manufacturing Co., Western Precipitation Division 108

Kaiser Engineers 49
Kaupp, C. B., & Sons 57
Koppers Co., Inc. 97, 104, 132

Lord Baltimore Hotel 56

McKee, Arthur G., & Co. 131

Magnaflux Corporation 68, 69
Marchant, Geo. F., Co. 97
Metal & Thermit Corporation 70
Metallurgical Products Department of General Electric Co. 14, 15
Midvale-Heppenstall Co. 58
Midwest Steel Division of National Steel Corporation 32, 33
Morgan Construction Co. 43

National Steel Corporation, Midwest Steel Division 32, 33
National Steel Corporation, Weirton Steel Division 32, 33

Page Steel & Wire Division, American Chain & Cable Co., Inc. 65
Pangborn Corporation ..... Inside Back Cover
Parkersburg-Aetna Corporation, Aetna Ball & Roller Bearing Co. Division 16

Republic Steel Corporation 12, 13
Robbins & Myers, Inc., Hoist & Crane Division 4
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 61
Royal McBee Corporation 44

Seaway Steel Corporation 106
SKF Industries, Inc. 2
Smith, A. O., Corporation, Welding Products Division 83, 84, 85, 86
Square D Co., Electric Controller & Mfg. Division ..... Inside Front Cover

Timken Roller Bearing Co., The, Steel & Tube Division 54
Torrington Co., The 102

Ulbrich Stainless Steels 111
Union Carbide Corporation, Union Carbide Metals Division 81
Union Carbide Metals Co., Division of Union Carbide Corporation 81
United States Steel Corporation, Subsidiaries 3
Universal Atlas Cement Division, United States Steel Corporation 3
Universal Grinding Corporation 132
U. S. Electrical Motors, Inc. ..... Back Cover

Vanadium-Alloys Steel Co. 129
Virginia Electric & Power Co. 29

Wales Strippit, Inc. 105
Wean Equipment Corporation 53
Weirton Steel Division of National Steel Corporation 32, 33
Western Precipitation Division of Joy Manufacturing Co. 108
Wheland Co., The, Foundry Division 134
Whiting Corporation 7

Yawata Iron & Steel Co., Ltd. 123

Zegers, Inc., Zelite Division 103

~ ~ ~

Table of Contents, Page 19

Classified Advertising, Page 131

Coming Jan. 23 IN STEEL

How a Cost Program Can Really Pay

Management and supervisors of the Tapco-Jet Group, Thompson Ramo Wooldridge Inc. have found less costly ways to do a wide variety of jobs—from office procedures, to production techniques, to scrap utilization.

Next week STEEL reports to you on how a cost patrol can turn in big dividends.

Quantity
PRODUCTION
of
GREY IRON CASTINGS

*

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

*

ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

The Pangborn Vibratory Finishing Machine

THE LONGER YOU OWN IT, THE MORE USEFUL IT IS!

"Every day we find new pieces it can finish," comes the word from the large, Midwestern die-casting firm shown above. And no wonder!

This machine makes itself useful in many ways: cleaning, descaling, radiusing, fine-finishing, burnishing or coloring. It can do all this with metals, alloys, many types of plastic and ceramic parts . . . and at speeds up to 100 times faster than conventional methods. It cleans the intricate or shielded surfaces you can't reach with barrel finishing or other means.

Available in many sizes, the Pangborn Vibratory Finishing Machine is the most compact unit in its field. Its standard equipment includes variable speeds and an exclusive air-cushioned suspension which assures automatic leveling and amplitude control. Auxiliary equipment, media and compounds available for every need.

Send parts with exact finish specifications or finished specimen, for sample processing in our laboratory to: Mr. William E. Brandt, PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control, Blast Cleaning and Vibratory Finishing Equipment—Rotoblast® Steel Shot and Grit.*℠

Pangborn

OF HAGERSTOWN

U.S. VARIDYNE system synchronizes conveyors for point-to-point pin transfer

Problem: Brunswick's "Dura-King" pin required multiple dips in liquid plastic to achieve its high impact-resistant plastic coating. Resultant highly explosive atmospheres required *explosion-proof* production methods. In addition, accurate synchronization for point to point transfer between *five* variable speed, multimotor conveyors was required. **Solution:** U.S. VARIDYNE a/c Drive System with *Coordinated Start and Stop Control,* and U.S. Explosion-Proof A.C. Motors. Richards-Wilcox engineers, working with Brunswick Corp. engineers and U.S. MOTORS field engineers, chose VARIDYNE over a d.c. system because: initial start-up is simplified; instantly synchronous without warm-up; needs no synchronizing readjustments; there is no cumulative error; and *explosion-proof a.c. motors* can be used. VARIDYNE varies the frequency of a.c. current to these motors, converting them to adjustable speeds...automatically coordinated. *Write today for* VARIDYNE *Brochure F-1963.*

U.S. ELECTRICAL MOTORS INC.

P. O. Box 2058 • Los Angeles 54, California or Milford, Conn.

US MOTORS